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PRELIMINARY LIST
OF THE
UREDINALES OF WASHINGTON

By
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Preliminary List of the Uredinales of Washington

J. W. Hotson
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Introduction

The state of Washington is a very fruitful field for the investigation of rusts. Comparatively little experimental work has been done. There are a number of heteroecious forms, particularly those coming on forest trees, whose alternate hosts are either unknown or imperfectly known. Careful systematic cultural work is a pressing need in order to establish with certainty the complete life cycle of these forms. It is not, however, with this phase of rusts that this article has to do, but rather with their collection and distribution. Many persons have collected rusts in the state and some new ones have been described, but no attempt has been made, even in a preliminary way, to bring together in the form of an annotated-list the results of these collections.

Up to 1918 no list of the rusts occurring in any of the states bordering on the Pacific Coast had been published. In that year Jackson published a rather complete list for the state of Oregon (Brooklyn Bot. Gard. Mem. 1:198-297, 1918). The following years Blasdale published a preliminary list for the state of California (Univ. of Calif. Pub. in Bot. 7:101-157, 1919). The present article is an attempt to bring together the known rusts of the state of Washington, thus completing in a general way the lists for all the Pacific Coast states. There is no claim made that this list is complete or that it even contains all the species that have been collected in the state. It has been prepared with the hope that it may be of use to other workers with rusts in the state in giving at least an approximate idea of the extent and distribution of this order.

General Plan of the Paper

The general plan of the paper has been to list alphabetically the genera of the rusts under their respective families, and the species under each genus. Keys to the families and genera are also submitted. The host plants are arranged alphabetically under each species of rust. Following each host-family the spore-forms possessed by the rusts are indicated by symbols. This does not mean that all of these spore-forms have been found in Washington, but they are inserted for the

convenience of those wishing to use the list. Under each host a list of collections is tabulated according to date, giving the locality, collector's name, his number, when possible, and often where the specimens are deposited. The localities are listed in an appendix indicating the county in which they occur.

Those synonyms which appear to be the most useful are placed under each species, but no attempt has been made to make a complete list of them. This may be obtained by consulting the N. Am. Flora at the page cited under each species.

When no collector is indicated the collections were made by the writer. All the collections mentioned have been examined by the writer except those reported from the Arthur Herbarium. Those marked as "Washington Uredineae" are the writer's collection and deposited at the University of Washington, Seattle. This consists of over 1000 specimens from different parts of the state, made by various collectors, and forms a nucleus of an exsiccata of the Uredinales of Washington. This preliminary list is based on over 2000 collections distributed among 224 species. The nomenclature of the host plants is that employed by Piper and Beattie in *The Flora of the Northwest Coast* and the *Flora of Southeastern Washington.*

Sources of Material

The material for this paper has been gleaned from various sources. The writer has had an opportunity of making collections in eastern Washington while working in the Yakima valley, fighting fire blight during the summers of 1914 and 1915; and during the summer of 1919 in the wheat belt, from Spokane to Walla Walla, while employed with the federal government in connection with a survey of smuts and rusts of cereals throughout that region. During the summer of 1922, while helping to combat the White Pine Blister Rust in western Washington the writer had an exceptionally good opportunity for making rust collections. Although these opportunities have contributed several hundred collections from various parts of the state, yet the success and value of the article is largely due to the generous cooperation of other collectors. Perhaps the greatest assistance in this respect was the privilege of looking over and obtaining data of all collections from the state of Washington deposited in the Arthur Herbarium at Purdue University. From this collection data on upwards of 500 collections were obtained. Mr. Wm. N. Suksdorf very generously placed at the writer's disposal his complete collection of rusts, consisting of over 300 specimens. Most of these collections

were made in the southern part of the state. Mr. W. E. Flowers, who collected largely in the vicinity of Spokane, contributed nearly 100 specimens. The collections of C. V. Piper have been obtained from different sources, partly from the herabrium of the Washington State College, partly from the Arthur Herbarium, and partly from those deposited at the University of Washington, at Seattle.

Dr. F. D. Heald very kindly loaned for examination the complete collection of rusts deposited at the Washington State College at Pullman. Collections were also received from Arthur Frank, C. R. Stillinger, J. S. Boyce, G. L. Zundel, E. Bethel, and many others, credit for which has been duly given in each instance.

Professor E. W. D. Holway and Dr. J. R. Wier have collected rather extensively in certain parts of the state, but the writer has had no opportunity of examining these collections except as they occur in one or the other of the herbaria already mentioned.

Acknowledgments

Very grateful acknowledgments are due to Professor H. S. Jackson for making it possible for the writer to obtain the data of specimens collected in Washington and deposited in the Arthur Herbarium; for naming numerous doubtful specimens, for examining the manuscript and offering valuable suggestions concerning it. Helpful suggestions have been received from Jackson's paper on the Uredinales of Oregon, as well as from the published portion of the North American Flora.

The writer is under great obligation also to all those who have contributed specimens for this list, especially those whose names have already been mentioned. He is also indebted to Mrs. Agnes Chase for identification of various grasses and to Dr. K. K. MacKenzie for determining species of Carex.

Some Characteristics of Rusts

The Uredinales include a group of very highly specialized fungi that are capable of growing only on living plants and die with the death of the host. The vegetative stage consists of minute much branched filaments (mycelium) which ramify among the cells of the host, sending suckers (haustoria) into the cells for nourishment. The reproductive phase, which is very complicated, consists of five different types of spores which always follow each other in a definite order (polymorphism). These spores differ from each other in form and size as well as in mode of production. They may all occur on

the same host (autoecism) or certain ones may occur on one host and others on an entirely different one (heteroecism) which usually belongs to a different family widely separated from the first in respect to "blood relationship." It is the determination of the life cycle of these heteroecious forms that is one of the difficult problems in connection with the study of rusts. To increase this difficulty one or more of these spore-forms may be wanting. This fact, connected with their obligate parasitism, heteroecism and polymorphism makes the study of this group one of the most difficult in the whole plant kingdom.

The following are the various spore forms found among the rusts:

1. *Pycnospores* (spermatia) designated by the symbol 0, occur in flask-shaped bodies, known as *pycnia* (spermogonia). These minute bacterium-like bodies, which apparently are functionless, are always associated on the same mycelium with the aecia if the latter are present.
2. *Aeciospores* (aecidiospores) designated by the symbol I, are formed in pustules which are usually more or less cup-shaped, known as *aecia* (aecidia). These spores are one-celled, have a number of germ pores and are formed in chains. On germination they produce mycelia on which urediniospores and teliospores are formed.
3. *Urediniospores* (uredospores) are designated by the symbol II. They are usually formed just below the epidermis which is eventually ruptured. The pustules thus formed are known as uredinia (uredo-sori). These spores are usually produced singly on the ends of short stalks, although occasionally, as in Chrysomyxa, they are formed in chains; they are one-celled, similar to the aecidiospores.
4. *Teliospores* (teleutospores), designated by the symbol III, are formed on the same mycelium that produces the urediniospores but usually later in the season. They may be formed singly on the ends of short stalks similar to the urediniospores (Pucciniaceae), or compressed laterally into a cushion-like mass or a column (Melampsoraceae). On germination they usually produce a mycelium of limited growth, with only four cells, known as a basidium (promycelium), each cell of which produces a single spore, a basidiospore (sporidium). In a few species the teliospore on germination simply elongates and divides into four cells, thus forming the basidium on which the four basidiospores are formed (Coleosporia-

ceae). The basidiospores, on germination, produce a mycelium on which aecia and pycnia are formed if the latter are produced at all in the life cycle. The basidiospore is not represented by a symbol because it invariably follows the germination of the teliospore.

In the life cycle of some rusts one or more of these spore forms may be wanting. Arthur in the N. Am. Flora has made use of this fact and has broken up the old, well established genera into long and short cycled forms, giving each of the latter a generic name. There are undoubtedly certain advantages in this system, but the multiplication of new genera and the elimination of many old familiar generic and specific names, like Puccinia and Uromyces, is unfortunate. Although in general the nomenclature of the N. Am. Flora has been followed, it seems to serve the purpose of this paper best not to follow it in this respect. For convenience of comparison, however, these generic names are given for Puccinia and Uromyces:

	Puccinia	*Uromyces*
1. Eu-type, having 0, I, II, III present	Dicaeoma	Negredo
2. Brachy-type, having 0, II, III present	Bullaria	Klebahnia
3. Opsis-type, having 0, I, III present	Allodus	Pucciniola
4. Micro-type, having 0, III present	Micropuccinia	Teleutospora

Examples of all these types will be found in the present list.

Since many of the collectors of Washington rusts do not reside within the state it is highly probable that many collections have been omitted from this list. For this reason a supplementary list will be published as soon as the number of new collections will warrant. If this report should come to the notice of any person who has made collections in any part of the state of Washington, the writer will be glad to receive samples, and due credit will be given for the same.

Order UREDINALES

The authorities on rusts differ somewhat in their mode of grouping the genera into families. Some make two, others three and still others four families. It seems best for our purpose to distribute the various genera into three families which may be distinguished by the following key.

KEY TO THE FAMILIES

A. Teliospores on germination becoming four-celled (internal basidium), compacted laterally into waxy layers; walls of the spores weakly gelatinous — COLEOSPORIACEAE (p. 279).

AA. Teliospores germinating by a promycelium (external basidium).

B. Teliospores compacted laterally into a crust or column (rarely solitary within the tissue); walls of the spores firm. — MELAMPSORACEAE (p. 281).

BB. Teliospores free or fascicled; walls of the spores firm or with an outer hygroscopic layer overlaid by cuticle — PUCCINIACEAE (p. 298).

AAA. Teliospores unknown — UREDINALES IMPERFECTI (p. 375).

COLEOSPORIACEAE

Aecia with peridia; telia waxy; teliospores sessile, usually compacted laterally into a cushion-like mass, and at maturity each divided into four superimposed cells, each of which produces a sterigma bearing a basidiospore (internal basidia).

There is only one genus of this family represented in Washington.

Coleosporium Lev.

1. Coleosporium occidentale Arth.

N. Am. Flora 7:94, 1907.

On Compositae: II, III. Heteroecious (0, I unknown).

Senecio hydrophiloides Rydb. Falcon Valley, Klickitat Co., July 17, 1896, W. N. Suksdorf 530, Wash. Ured. 679, also July 17, 1900, W. N. Suksdorf 586, Wash. Ured. 701.

Senecio triangularis Hook. Mt. Adams, Aug. 7, 1885, W. N. Suksdorf 197, Wash. Ured. 548.

2. Coleosporium madiae Cooke.

Grevillea 7:102, 1879; N. Am. Flora 7:92, 1907.
Stichospora madiae Sydow, Ann. Myc. 2:30, 1904.
Coleosporium arnicale Arth. N. Am. Flora 7:94, 1907.

On Compositae: II, III. Heteroecious (0, I unknown).

Madia sp. Falcon Valley, July 30, 1885, W. N. Suksdorf 199, Wash. Ured. 549, also Oct. 30, 1901, W. N. Suksdorf 644, Wash. Ured. 720; Vancouver Lake, Aug. 16, 1894, W. N. Suksdorf 395, Wash. Ured. 647; Friday Harbor, July, 1924, L. Angst, Wash. Ured. 1342.

This disposition of *Coleosporium arnicale* Arth. as a synonym of *Coleosporium madiae* Cooke is in accordance with Jackson's arrangement as given in Mycologia 14:114, 1922. The description of *C. arnicale* in 1907 was based on the single collection of W. N. Suksdorf 644, cited above. The host was originally identified as *Arnica foliosa* Nutt. but was interpreted by Arthur as *A. cana* Greene. No other collections of Coleosporium on Arnica have been reported and there is some doubt as to the validity of the species. Jackson (l. c.) is of the opinion that the host is a species of Madia or some close relative.

It is interesting to note that all the species of Coleosporium as far as known, have their aecial stage on Pinus. Species of this genus with undetermined aecia might, therefore, be looked for as Perider-

miums on the leaves of some species of Pinus, especially the two-needled pines.

3. Coleosporium solidaginis (Schw.) Thüm.

Bull. Torrey Club 6:216, 1878; N. Am. Flora 7:90, 1907.
Uredo solidaginis Schw. Schr. Nat. Ges. Leipzig 1:70, 1822.
Peridermium acicolum Und. & Earle, Bull. Torrey Club 23:400, 1896.
Peridermium montanum Arth. & Kern, Bull. Torrey Club 33:413, 1906.

On Pinaceae: 0, I. Heteroecious.

Pinus contorta Dougl. Bingen, May 3, 1913, W. N. Suksdorf 1062, Wash. Ured. 760; Locke, May 26, 1918, W. E. Flowers 6175, Wash. Ured. 2570.

On Compositae: II, III.

Aster eatoni (Gray) Howell. Seattle, Sept., 1872, C. V. Piper 64, Herb. W. S. C., Wash. Ured. 1289.

Aster fremonti (T. & G.) Gray. Waitsburg, Oct. 8, 1899, R. M. Horner 1405, Herb. W. S. C., Wash. Ured. 1820, also collected by G. L. Zundel Oct. 7, 1922, Wash. Ured. 1319.

Aster laevis geyeri Gray. Colfax, Aug. 25, 1898, C. V. Piper 636, Herb. W. S. C.

Aster punicens L. Spokane, Sept. 20, 1914, W. E. Flowers, 6055, Wash. Ured. 2539.

Grindelia oregana Gray. Rolling Bay, Oct. 9, 1921. Wash. Ured. 203; Winslow, June 20, 1922, Wash. Ured. 1174.

Grindelia sp. Langley, Sept. 1922, J. M. Grant, Wash. Ured. 305.

Solidago elongata Nutt. Mt. Adams, Aug. 8, 1886, W. N. Suksdorf 274, Wash. Ured. 585; Lacey, July 2, 1921, A. Frank 72, Wash. Ured. 415.

Solidago missouriensis Gray. Pullman, July 14, 1894, C. V. Piper 241, Herb. W.S.C., Arth. Herb., also by G. L. Zundel, Sept. 13, 1920, Wash. Ured. 1275; Spokane, Aug. 10, 1913, W. E. Flowers 6121, Wash. Ured. 2554.

Solidago serotina Ait. Waitsburg, Oct. 13, 1899, R. M. Horner 1413, Herb. W.S.C.

Solidago tolmieana Gray. Lacey, July 2, 1921, A. Frank, Wash. Ured. 416.

Solidago sp. Pullman, Sept. 11, 1918, B. F. Dana, Herb. W.S.C. 530, Wash. Ured. 1291.

MELAMPSORACEAE

Teliospores sessile, compacted laterally into a more or less definite crust or column, rarely solitary within the tissues (Uredinopsis); on germination they produce a promycelium (basidia external).

A. Telia indehiscent; teliospores not in chains.
  B. Teliospores 2-4-celled, formed by vertically intersecting septa.
    C. Telia on ferns; teliospores colorless or yellowish, scattered singly in host tissue or formed in the epidermal cells.
      D. Teliospores intercellular, scattered within the mesophyll; uredinium with a peridium; urediniospores pointed, colorless, without germ pores; pycnia subcuticular.
        Uredinopsis (p. 296).
      DD. Teliospores intracellular; urediniospores not pointed; pycnia subepidermal.
        E. Uredinia with a peridium; urediniospores colorless, without evident germ-pores Milesia (p. 293).
        EE. Uredinia without or with a very rudimentary peridium; urediniospores yellowish with germ-pores
          Hyalopsora (p. 287).
    CC. Telia on seed-plants; teliospores brownish in the epidermal cells or forming subepidermal crusts.
      F. Teliospores intracellular, in swollen epidermal cells; life cycle with 0, I, III. Calyptospora (p. 282).
      FF. Teliospores intercellular, subepidermal; not forming swollen epidermal cells; life cycle with O, I, II, III
        Pucciniastrum (p. 294).
  BB. Teliospores one-celled, united into a cushion-like mass.
    G. Teliospores in the epidermal cells, hyaline or faintly colored; uredinium with a peridium but without paraphyses; urediniospores without evident pores; aecium with a peridium.
      Melampsorella (p. 292).
    GG. Teliospores not intracellular, brown.
      H. Telia subepidermal or subcuticular; uredinium without a peridium but with paraphyses; aecium of the Caeoma-type.
        Melampsora (p. 288).
      HH. Telia subepidermal; uredinium with a peridium but without paraphyses; aecium with a peridium.
        Melampsoridium (p. 293).
AA. Telia erumpent, all the sori subepidermal; teliospores in chains.

I. Teliospores compacted laterally into a more or less cushion-like mass; urediniospores in chains. Chrysomyxa (p. 282).

II. Teliospores compacted laterally into a column; urediniospores borne singly on pedicels Cronartium (p. 284).

Calyptospora Kühn

4. Calyptospora columnaris (Alb. & Schw.) Kühn.

Rab.—Wint. Fungi Eur. 3521, 1886, (Hedwigia 26:28, 1887); N. Am. Flora 7:114, 1907.

Aecidium columnare Alb. & Schw. Consp. Fung. 121, 1805.

Calyptospora geoppertiana Kühn, Hedwigia 8:81, 1869.

On Pinaceae: 0, I. Heteroecious.

Abies amabilis (Loud.) Forb. Mt. Rainier, Sept. 26, 1915, C. H. Kauffman 7, Arth. Herb.; Lake Cushman, Olympic Mts., Oct. 25, 1915, C. H. Kauffman, Arth. Herb.; Big Four, Aug. 23, 1921, J. S. Boyce 65, Arth. Herb.

Abies lasiocarpa (Hook.) Nutt. Locke, Aug. 27, 1917, W. E. Flowers 6586, Wash. Ured. 1130.

On Vacciniaceae: III.

Vaccinium macrophyllum (Hook.) Piper. Locke, Aug. 5, 1915, W. E. Flowers 6393, Wash. Ured. 1131; Silverton, July 7, 1920, C. R. Stillinger 738, Wash. Ured. 850.

Vaccinium ovalifolium Smith. Silverton, July 8, 1920, C. R. Stillinger 734, Wash. Ured. 837.

Vaccinium ovatum Push. Bainbridge Is., Aug. 3, 1909, E. Bartholomew, Barth. N. Am. Ured. 403, Barth. Fungi Columb. 3104, Arth. Herb.; Seattle, Sept. 23, 1916, W. E. Flowers 6119, Wash. Ured. 2552; Shelton, Sept. 23, 1918, Wash. Ured. 335; Winslow, Oct. 18, 1918, Wash. Ured. 82; Olympic Mts., July, 1919, Grace Howard, Wash. Ured. 336; Langley, March, 1922, J. M. Grant, Wash. Ured. 296; Chico, May 30, 1922, Maxine Wilkes, Wash. Ured. 964; Vashon Island, Oct. 2, 1922, Wash. Ured. 1069; Lake Quinault, Oct., 1922, E. Bethel; Quilcene, Nov. 15, 1922, E. Bethel, Wash. Ured. 1078.

Vaccinium parviflorum Smith. Seattle, Oct., 1891, C. V. Piper, Arth. Herb., Wash. Ured. 2880; Glacier, July and Oct., 1922, E. Bethel.

Vaccinium sp. Paradise Valley, Mt. Rainier, Aug. 23, 1901, E. W. D. Holway, Arth. Herb.

Chrysomyxa Unger

5. Chrysomyxa ledicola Lagerh.

Tromso. Mus. Aarsh. 16:119. 1893.

Uredo ledicola Peck, Ann. Rep. N. Y. State Mus. 25:90. 1873.

Peridermium decolorans Peck, Ann. Rep. N. Y. State Museum 27: 104, 1875.

Melampsoropsis ledicola (Peck) Arth. Result, Sci. Congr. Bot. Vienne 338. 1906; N. Am. Flora 7:119. 1907.

On PINACEAE: 0, I. Heteroecious.

Picea sitchensis (Bong.) T. & M. Bainbridge Island, July 29, 1909, E. Bartholomew, Barth. Fungi Columb. 3152, Arth. Herb.; Ilwaco, July, 1918, Wash. Ured 84.

On ERICACEAE: II, III.

Ledum groenlandicum Oeder. Seattle, June, 1892, C. V. Piper 74, Arth. Herb., Wash. Ured. 2881; Mt. Rainier, Aug. 31, 1901, E. W. D. Holway, Arth. Herb.; Ronald, July 7, 1910, T. C. Frye, Arth. Herb., Wash. Ured. 71; Seattle, May 19, 1915, Arth. Herb., Wash. Ured. 330; Granite, July 5, 1920, C. R. Stillinger 744, Wash. Ured. 847; Woodinville, Nov. 6, 1921, T. C. Frye, Wash. Ured. 224; Friday Harbor, July, 1922, L. Hartge, Wash. Ured. 1000.

6. Chrysomyxa piperiana (Arth.) ~~comb. nov.~~ Sacc. & Trotter

Melampsoropsis piperiana Arth. N. Am. Flora 7:120, 1907.

On ERICACEAE: II. (0, I and III unknown).

Rhododendron californicum Hook. Seattle, May 6, 1892, C. V. Piper, Arth. Herb. (type collection), also June, 1914, Wash. Ured. 967; Duckabush River, Aug. 12, 1912, E. Bartholomew 4843, Arth. Herb.; Spokane, Aug. 30, 1912, W. E. Flowers 6407, Wash. Ured. 1110; Charleston, May 22, 1921, Grace Howard, Wash. Ured. 196; Langley, May, 1922, Alexia Reuter, Wash. Ured. 973; Chico, May, 1922, L. Sundquist, Wash. Ured. 969; Port Orchard, July, 1922, Wash. Ured. 1010; Seabeck, July, 1922, Wash. Ured 1011; Olalla, July, 1922, Wash. Ured. 1003; Holly, July, 1922, Wash. Ured. 1009; Silverdale, July, 1922, Wash. Ured. 1007; Port Gamble, July, 1922, Wash. Ured. 1005; Kingston, July, 1922, Wash. Ured. 1008; Dewatto, July, 1922, Wash. Ured. 1006; Shelton, July, 1922, Wash. Ured. 1004; Port Townsend, Jan. 5, 1924, P. S. Simcoe, Wash. Ured. 1284.

7. Chrysomyxa pirolae (D.C.) Rostr.

Bot. Centr. 3:126. 1881.

Peridermium conorum piceae Arth. and Kern. Bull. Torrey Club. 33:431. 1906.

Melampsoropsis pyrolae (DC) Arth. Result. Sci. Congr. Bot. Vienne 338. 1906; N. Am. Flora 7:118. 1907.

On PYROLACEAE: II, III. (0, I unknown).

Moneses uniflora (L.) Gray. North Cove, Apr. 15, 1908. T. C. Frye, Arth. Herb.

Pyrola bracteata Hook. Locke, June 16, 1916. W. E. Flowers 6176, Wash. Ured. 2571; Mt. Adams, July 27, 1895. W. N. Suksdorf 463, Wash. Ured. 675.

Pyrola chlorantha Swartz. Hillyard, Aug. 7, 1913, W. E. Flowers 6359, Wash. Ured. 1126; also July 7, 1914, Wash. Ured. 2575.

Pyrola secunda L. Locke, June 20, 1917, W. E. Flowers 6064, Wash. Ured. 2543.

Cronartium Fries

8. Cronartium coleosporioides (Dietel & Holway) Arth.

N. Am. Flora 7:123. 1907.
Peridermium filamentosum Pk. Bot. Gaz. 7:56. 1882.
Peridermium harknessii Moore, Bull. Calif. Acad. Sci. 1:37. 1884.
Uredo coleosporioides Dietel & Holway, Erythea 1:247. 1893.
Peridermium stalactiforme Arth. & Kern. Bull. Torrey Club, 33:419. 1906.
Cronartium filamentosum (Pk.) Hedgcock, Phytopath. 2:177. 1912.

On Pinaceae: 0, I. Heteroecious.

Pinus contorta Dougl. Chiquash Mts., Aug. 12, 1886, W. N. Suksdorf 302, Wash. Ured. 588; Locke, May 30, 1916, W. E. Flowers 6390, Wash. Ured. 1109; Mt. Adams, July, 1922, Ed. S. Meany, Wash. Ured. 1269.

Pinus ponderosa Dougl. Cascade Mts., Aug., 1918, Wash. Ured. 1338.

On Scrophulariaceae: II, III.

Castilleja miniata Dougl. Skamania Co., Aug. 10, 1886, W. N. Suksdorf, Arth. Herb.

Pedicularis surrecta Benth. Locke, W. E. Flowers 6376, Wash. Ured. 1129.

Our knowledge of the life cycle of this rust is somewhat uncertain. Conflicting reports are found, and until successful infection experiments have been carried out it is almost impossible to clear up the situation. There are at least two caulicolous, non-gall-forming species of Peridermium, both of which have their telial stage on Castilleja.

All the records given above are of the gall-forming type of aecia.

9. Cronartium occidentale Hedgc., Bethel & Hunt.

Jour. Agric. Res. 14:413, 1918.

On Saxifragaceae: II, III. Heteroecious (0, I on Pinaceae).

Ribes aureum Pursh. West of Spokane, Aug. 12, 1912, W. E. Flowers 6415, Wash. Ured. 1178.

Ribes odoratum Wendl. Spokane, Oct. 20, 1914, W. E. Flowers 6360, Wash. Ured. 1179.

This is the piñon blister rust, which resembles very closely the white pine blister rust, except that the aecia occur on the 1- and 2-needled pines, while the latter occurs on the 5-needled pines.

10. Cronartium pyriforme (Pk.) Hedgc. & Long.

Alt. Stage of Peridermium pyriforme 3. 1914.
Peridermium pyriforme Peck, Bull. Torrey Club 6:13. 1875.
Cronartium comandrae Peck, Bull. Torrey Club 11:50. 1884.
Peridermium betheli Hedgc. & Long, Phytopath. 3:251. 1913.

On PINACEAE: 0, I. Heteroecious.

Pinus ponderosa Dougl. Wenatchee, May, 1914, D. F. Fisher 12467, Forest Pathology, Washington, D.C.; Locke, May 21, 1915. W. E. Flowers 6418, Wash. Ured. 1113; Spokane, June 11, 1919, W. E. Flowers 6191, Wash. Ured. 1114 also May 22, 1921, F. D. Heald, Herb. W.S.C. 765.

On SANTALACEAE: II, III.

Comandra pallida DC. Newport, Aug., 1915, J. R. Weir, Barth., N. Am. Ured. 1711; Locke, Sept. 13, 1915, W. E. Flowers 6341, Wash. Ured. 1166.

Comandra umbellata (L). Nutt. Trout Lake, July, 1884, W. N. Suksdorf 176, Wash. Ured. 1321; Bingen, Sept. 21, 1904, C. V. Piper Herb. W.S.C.

11. Cronartium ribicola Fisch. de Waldh.

Rab. Fungi Eur. 1595 (Hedwigia 11:182) 1872; N. Am. Flora 7:122. 1907.
Peridermium strobi Kleb. Abh. Nat. Ver. Bremen 10:153. 1887.

On PINACEAE: 0, I. Heteroecious.

Pinus strobus L. Everett, Nov. 20, 1921, H. N. Putnam; Blaine, July 11, 1922, W. S. Smith.

Pinus monticola Dougl. Quilcene, April 14, 1924, H. N. Putnam, Bur. Pl. Ind. Blister Rust Control; De Lions, Apr. 15, 1924, H. N. Putnam, Bur. Pl. Ind. Blister Rust Control; Sumas, April 17, 1924, H. N. Putnam, Bur. Pl. Ind. Blister Rust Control.

On SAXIFRAGACEAE: II, III.

Ribes bracteosum Dougl. Quilcene, Aug. 16, 1922, C. H. Johnson, Wash. Ured. 890; Port Ludlow, Sept. 9, 1922, Wash. Ured. 913; Woodman, Sept. 13, 1922, Wash. Ured. 914; Hadlock, Sept. 14, 1922, Wash. Ured. 915; Snow Creek, Sept. 15, 1922, P. S. Simcoe, Wash. Ured. 888; Junction, Sept. 15, 1922, P. S. Simcoe, Wash. Ured. 1268; Chimacum, Sept. 15, 1922, Wash. Ured. 918; De Lions, Sept. 15, 1922, Wash. Ured. 919; Discovery Bay, Sept. 15, 1922, Wash. Ured. 916; Lake Croker, Sept. 15, 1922, Wash. Ured. 917; Port Discovery, Sept. 16, 1922, P. S. Simcoe, Wash. Ured. 889; Mt. Pleasant Rd., Sept. 19, 1922, Wash. Ured. 920; Port Angeles, Sept. 21, 1922, C. H. Johnson, Wash. Ured. 921; Joyce, Sept. 21, 1922, Wash. Ured. 923; Piedmont,

Sept. 22, 1922, Wash. Ured. 924; Seabeck, Sept. 26, 1922, Wash. Ured. 926; Lofall, Sept. 26, 1922, Wash. Ured. 927; Silverdale, Sept. 27, 1922, Wash. Ured. 928; Olalla, Sept. 28, 1922, Wash. Ured. 929; Gig Harbor, Oct. 20, 1922, C. H. Johnson, Wash. Ured. 894; Burley, Oct. 20, 1922, C. H. Johnson, Wash. Ured. 895; Glacier, Oct. 25, 1922, C. H. Johnson, Wash. Ured. 893; Bow, Oct. 30, 1922, C. H. Johnson, Wash. Ured. 912; Deming, Oct. 31, 1922, C. H. Johnson, Wash. Ured. 899; Noon, Oct. 31, 1922, C. H. Johnson, Wash. Ured. 900; Van Zandt, Nov. 6, 1922, E. Bethel, Wash. Ured. 904; Bellingham, Nov. 7, 1922, E. Bethel, Wash. Ured. 906; Sedro Woolley, Nov. 10, 1922, E. Bethel, Wash. Ured. 907.

Ribes nigrum L. Port Townsend, Oct., 1921, H. N. Putnam, Wash. Ured. 947; Sumas, Nov. 17, 1921, H. N. Putnam, Wash. Ured. 871; Mt. Vernon, Nov. 20, 1921, H. N. Putnam, Wash. Ured. 872; Everett, Nov., 1921, E. Bethel, Bur. Pl. Ind.; Edison, June 25, 1922, D. B. Leonard, Wash. Ured. 873; Sedro Woolley, June 27, 1922, R. M. Oltman, Bur. P. Ind.; Clear Lake, July 6, 1922, L. A. Huber, Bur. P. Ind.; Blaine, July 11, 1922, W. S. Smith, Bur. P. Ind.; Birch Bay, July 15, 1922, P. Young, Bur. P. Ind.; Deming, July 24, 1922, C. F. Lackey, Bur. P. Ind.; Bellingham, July 31, 1922, D. B. Leonard, Wash. Ured. 875; Oak Harbor, Aug. 4, 1922, H. N. Putnam, Wash. Ured. 876; Greenback, Aug. 4, 1922, H. N. Putnam, Wash. Ured. 877; Friday Harbor, Aug. 7, 1922, R. S. Sprague, Wash. Ured. 878; Shaw Island, Aug. 8, 1922, H. M. Walker, Bur. P. Ind.; Birch Bay, Aug. 9, 1922, C. H. Spiegelberg, Wash. Ured. 879; Licking, Aug. 10, 1922, H. N. Putnam, Bur. P. Ind.; Bellingham, Aug. 10, 1922, D. B. Leonard, Wash. Ured. 880; Marietta, Aug. 11, 1922, G. A. Huber, Wash. Ured. 881; Doe Bay, Aug. 11, 1922, H. M. Walker, Bur. P. Ind.; Olga, Aug. 11, 1922, H. M. Walker, Wash. Ured. 882; Ferndale, Aug. 12, 1922, G. A. Huber, Bur. P. Ind.; East Sound, Aug. 15, 1922, R. S. Sprague, Wash. Ured. 883; La Conner, Aug. 17, 1922, Moreland & Smith, Bur. P. Ind.; Arlington, Aug. 18, 1922, Rex Brown, Bur. P. Ind.; Nooksack, Aug. 21, 1922, M. M. Hess, Bur. P. Ind.; Mackay Harbor, Aug. 21, 1922, R. S. Sprague, Wash. Ured. 884; Cove, Aug. 22, 1922, W. S. Smith, Wash. Ured. 891; Oak Harbor, Aug. 22, 1922, H. N. Putnam, Wash. Ured. 885; Bay Center, Aug. 24, 1922, Wash. Ured. 930; Ilwaco, Aug. 25, 1922, Wash. Ured. 931; Oysterville, Aug. 25, 1922, Wash. Ured. 932; Oceanside, Aug. 25, 1922, Wash. Ured, 933; Rhodesia, Aug. 29, 1922, Wash. Ured. 934; Port Townsend, Sept. 9, 1922, Wash. Ured. 935; Shine, Sept. 11, 1922, Wash. Ured. 936; Woodman, Sept. 13, 1922, Wash. Ured. 937;

Chimacum, Sept. 15, 1922, Wash. Ured. 938; Sequim, Sept. 18, 1922, Wash. Ured. 939; Dungeness, Sept. 18, 1922, Wash. Ured. 940; Port Angeles, Sept. 21, 1922, Wash. Ured. 941; Seabeck, Sept. 25, 1922, Wash. Ured. 942; Port Gamble, Sept. 26, 1922, Wash. Ured. 943; Poulsbo, Sept. 27, 1922, Wash. Ured. 944; Suquamish, Sept. 27, 1922, Wash. Ured. 945; Keyport, Sept. 27, 1922, Wash. Ured. 946; Forks, Oct. 9, 1922, H. G. Bartow, Wash. Ured. 892; Belfair, Oct. 12, 1922, C. H. Johnson, Wash. Ured. 893; Aberdeen, Oct. 24, 1922, E. Bethel, Wash. Ured. 897; Chico, Nov. 16, 1922, H. G. Bartow, Wash. Ured. 909; Port Angeles, Nov. 23, 1922, C. H. Johnson, Wash. Ured. 910; Chesaw, Sept. 7, 1923, Root and Back, Bur. Pl. Ind., Blister Rust Control; Molson, Sept. 8, 1923, Root and Back, Bur. Pl. Ind., Blister Rust Control; Tonasket, Sept. 7, 1923, Root and Back, Bur. Pl. Ind. Blister Rust Control; Danville, Sept. 21, 1923, P. S. Simcoe, Bur. Pl. Ind. Blister Rust Control.

Ribes divaricatum Dougl. Sequim, Sept. 21, 1922, Wash. Ured. 922; Center, Nov. 15, 1922, P. S. Simcoe, Wash. Ured. 908.

Ribes sanguineum Pursh. Sequim, Nov. 25, 1922, P. S. Simcoe, Wash. Ured. 911.

Ribes vulgare Dougl. Doe Bay, Aug. 11, 1922, H. W. Walker, Bur. Pl. Ind.; Sequim, Oct. 23, 1922, H. G. Bartow, Bur. Pl. Ind.; Aberdeen, Nov. 1, 1922, W. S. Smith, Wash. Ured. 902; Port Gamble, Nov. 6, 1922, H. G. Bartow, Wash. Ured. 903; Chesaw, Sept. 8, 1923, Root and Bach, Bur. Pl. Ind. Blister Rust Control.

Hyalopsora Magn.

12. **Hyalopsora aspidiotus** (Pk.) Magn.

Ber. Deuts. Bot. Ges. 19:582, 1901; N. Am. Flora 7:112, 1907.
Uredo aspidiotus Pk. Ann. Rept. N. Y. State Mus. 24:88, 1872.
Hyalopsora polypodii-dryopteridis Magn. Hedwigia Beibl. 41:224, 1902.

On Polypodiaceæ: II, III. Heteroecious. (0, I probably on Abies).

Phegopteris dryopteris (L.) Fee. Chiquash Mts., Aug. 19, 1892, W. N. Suksdorf 354, Wash. Ured. 616; Newport, Feb. 28, 1916, J. R. Weir 63, Arth. Herb.; Sol Duc Hot Springs, July 13, 1920, J. S. Boyce 624, Wash. Ured. 2853.

The genus Hyalopsora has been reported to have two sets of spores that resemble urediniospores, both being borne singly on pedicels. Arthur in N. Am. Flora regarded these as aecio- and urediniospores, while some other authors referred to them as two kinds of urediniospores, the aecia being wanting or occurring on another host.

Recent investigations would indicate that this genus and also Uredinopsis are heteroecious, the aecial stage coming on some species of Abies.

13. Hyalopsora laeviuscula (D. & H.) Arth.

N. Am. Flora 7:113, 1907.
Uredo laeviuscula Dietel & Holway, Erythea 2:217, 1894.

On Polypodiaceae: II, III. Heteroecious (0, I probably on Abies).

Polypodium occidentale (Hook.) Maxon. Klickitat River, May 8, 1886, W. N. Suksdorf 237, Wash. Ured. 563; Bingen, May 12, 1904, W. N. Suksdorf 973, Wash. Ured. 738.

14. Hyalopsora polypodii (DC.) Magn.

Ber. Deuts. Bot. Ges. 19:582, 1901; N. Am. Flora 7:112, 1907.
Uredo polypodii DC. Fl. Fr. 6:81, 1815.

On Polypodiaceae: II, III. Heteroecious.

Filix fragilis (L.) Underw. Bingen, May 12, 1904, W. N. Suksdorf 974, Wash. Ured. 739; Fort George Wright, May 27, 1920, W. E. Flowers 6412, Wash. Ured. 1259; Mt. Rainier, Aug. 13, 1920, A. Frank, 117, Wash. Ured. 423.

Woodsia oregana D. C. Eaton. Spokane, May 21, 1912, W. E. Flowers 6411, Wash. Ured. 1140; Locke, Aug. 30, 1915, W. E. Flowers 6112, Wash. Ured. 2549.

Melampsora Cast.

15. Melampsora abietis-canadensis (Farl.) Ludwig.

Phytopath. 5:279, 1915.
Caeoma abietis-canadensis Farl. Proc. Am. Acad. 20:323, 1885.
Peridermium fructigenum Arth. Bull. Torrey Club 37:578, 1910.
Caeoma tsugae Spaulding, Sci. n. s. 33:194, Hyponym, 1911.

On Salicaceae: II, III (0, I on *Tsuga canadensis* (L.) Carr.)

Populus alba L. Clarkston, May 6, 1915, B. F. Dana, Herb. W.S.C. 91, Wash. Ured. 2714.

16. Melampsora albertensis Arth.

Bull. Torrey Club 33:517, 1906; N. Am. Flora 7:665, 1924.
Caeoma occidentalis Arth. Bull. Torrey Club 34:591, 1907.
Uredo albertensis Arth. N. Am. Flora 7:101, 1907.

On Pinaceae: 0, I. Heteroecious.

Pseudotsuga mucronata (Raf.) Suds. Longmire Springs, Mt. Rainier, Aug., 1913, C. Von Tubeuf (Nat. Zeit. f. Forst und Landw. 12:19, 1914) Arth. Herb.; Spokane, July 10, 1914, W. E. Flowers

6063, Wash. Ured. 2542; Locke, Aug. 25, 1915, W. E. Flowers 6479, Wash. Ured. 1147; Lake Chelan, Aug. 22, 1916, J. R. Weir, Barth. N. Am. Ured. 1721.

On SALICACEAE: II, III.

Populus tremuliodes Michx. Spokane, Sept. 10, 1910, W. E. Flowers 6327, Wash. Ured. 2593; Bellingham, June, 1913, J. R. Weir 33, Arth. Herb.; Locke, Aug. 25, 1915, W. E. Flowers 6378, Wash. Ured. 1146; Pullman, Sept. 2, 1920, B. F. Dana, Herb. W.S.C. Wash. Ured. 1160.

17. Melampsora humboldtiana Speg.

An. Mus. Nac. Buenos Aires 23:28, 1912; N. Am. Flora 7:668, 1924.
Melampsora americana Arth. Bull. Torrey Club, 47:465, 1920.

On PINACEAE: 0, I. Heteroecious.

Abies grandis Lindl. Sol Duc Hot Springs, July 14, 1921, J. R. Weir, Arth. Herb.

Abies lasiocarpa (Hook.) Nutt. Seattle, 1906, Bonser 35, Arth. Herb.

On SALICACEAE: II, III.

Salix bebbiana Sarg. Metaline Falls, J. R. Weir 10, Arth. Herb.

Salix sp. Tumwater, Sept. 24, 1919, Wash. Ured. 323; Parker Lake, June, 1920, W. E. Flowers 6408, Wash. Ured. 1251.

18. Melampsora bigelowii Thüm.

Mitth. Forstl. Vers. Oest. 2:37, 1879.
Melampsora paradoxa Diet. & Holw. Hedw. Beibl. 40:32. 1901.
Uredo bigelowii (Thüm.) Arth. Result. Sci. Congr. Bot. Vienne 338. 1906; N. Am. Flora 7:100. 1907.

On PINACEAE: 0, I. Heteroecious.

Larix occidentalis Nutt. Locke, Sept. 16, 1916, W. E. Flowers 6380, Wash. Ured. 1159.

On SALICACEAE: II, III.

Salix bebbiana Sarg. Pullman, June 29, 1898, C. V. Piper 511, Wash. Ured. 2924; Locke, June 20, 1915, W. E. Flowers 6174, Wash. Ured. 2569; Spokane, June 11, 1919, W. E. Flowers 6237, Wash. Ured. 2577.

Salix cordata Muhl. Pullman, June 29, 1898, C. V. Piper 512, Herb. W.S.C.; Waitsburg, Oct. 15, 1900, R. M. Horner 1495, Herb. W.S.C.

Salix fluviatilis Nutt. Pullman, Sept. 23, 1893, C. V. Piper 503, Wash. Ured. 2888; Waitsburg, Aug. 27, 1897, R. M. Horner, Wash. Ured. 2922.

Salix hookeriana Barr. Hoquiam July 2, 1920, C. R. Stillinger 760, Wash. Ured. 1090.

Salix lasiandra lyallii Sarg. Seattle, Oct. 16, 1891, A. M. Parker 25, Herb. W.S.C., also Sept. 1892, C. V. Piper 505, Herb. W.S.C., Wash. Ured. 1294; Pullman, Sept. 23, C. V. Piper 504, Wash. Ured. 2887; Bainbridge Island, Aug. 4, 1909, Mr. & Mrs. E. Bartholomew, Fungi Columb. 3141, Herb. W.S.C.; Spokane, April 13, 1912, W. E. Flowers, 6124, Wash. Ured. 2555.

Salix myrtilloides L. Seattle, June, 1892, C. V. Piper, Herb. W. S.C. Wash. Ured. 1295.

Salix piperi Bebb. Wenatchee, July 15, 1912, E. Bartholomew, Fungi Columb. 4432, Herb. W.S.C.

Salix scouleriana Barr. Seattle, Oct. 1891, C. V. Piper 24, Herb. W.S.C., Wash. Ured. 1293; Pullman, July 19, 1899, R. M. Horner 1289, Herb. W.S.C.; Bainbridge Island, Aug. 10, 1909, E. Bartholomew, Fungi Columb. 3142, Herb. W.S.C.

Salix sitchensis Sans. Olympia, Sept. 12, 1912, E. Bartholomew, Fungi Columb. 4433, Herb. W.S.C.

Salix sp. Bingen, Oct. 13, 1894, W. N. Suksdorf 411, Wash. Ured. 661; Mt. Adams, Sept. 5, 1900, W. N. Suksdorf 589, Wash. Ured. 704; Spokane, Sept. 10, 1905, W. E. Flowers 6102, Wash. Ured. 1148; Nespelem, Sept. 20, 1915, B. F. Dana, Herb. W.S.C. 377, Wash. Ured. 1164; Pullman, July 6, 1916, B. F .Dana, Herb. W. S. C. 347, Wash. Ured. 1163; Seattle, Oct. 3, 1919, Wash. Ured. 321; Ellensburg, Sept. 18, 1920, G. L. Zundel, Wash. Ured. 1281; Puyallup, July 17, 1921, A. Frank 128, Wash. Ured. 413.

19. Melampsora confluens (Pers.) Jackson.

Brooklyn Bot. Gard. Mem. 1:210. 1918.
Uredo confluens Pers. Obs. Myc. 1:98, 1796; N. Am. Flora 7:99, 1907; 7: 667, 1924.

On Saxifragaceae: 0, I. Heteroecious.

Ribes bracteosum Dougl. Kerriston, July 10, 1920. F. G. Renner, Wash. Ured. 164; Stampede, July 10, 1920, F. G. Renner, Wash. Ured. 165; Glacier, May 22, 1922, H. N. Putnam, Wash. Ured. 953.

Ribes divaricatum Dougl. Silverton, July 5, 1920, C. R. Stillinger 731, Wash. Ured. 35; Glacier, May 22, 1922, H. N. Putnam, Wash. Ured. 954.

Ribes lacustre (Pers.) Poir. Cascade Mts., Aug. 10, 1893. J. A. Allen. Arth. Herb.; Glacier, May 22, 1922, H. N. Putnam, Wash. Ured. 955.

On Salicaceae: II, III.

Salix bebbiana Sargent. Locke, Sept. 13, 1915, W. E. Flowers 6362. Wash. Ured. 1149.

Salix cordata Muhl. Spokane, Sept. 16, 1912, W. E. Flowers 6367, Wash. Ured. 1150.

Salix geyeriana Anderss. Hartford, July 9, 1920, C. R. Stillinger, Arth. Herb., Wash. Ured. 845.

Salix scouleriana Barr. Hoquiam, July 2, 1920, C. R. Stillinger 1049, Arth. Herb.; Glacier, July 7, 1920, C. R. Stillinger 753, Wash. Ured. 1083; Hartford, July 9, 1920, C. R. Stillinger 742; Kirkland, July 10, 1920, C. R. Stillinger 723, Wash. Ured. 828; Monte Cristo, Aug. 8, 1920, F. G. Renner, Arth. Herb.

Salix sitchensis Sans. Bothell, July 25, 1920, C. R. Stillinger 848, Arth. Herb.

Salix subcoerulae Piper. Montborne, Aug. 17, 1920, W. E. Morgan, Arth. Herb.

Salix sp. White Salmon River, Sept. 12, 1884, W. N. Suksdorf 159, Wash. Ured. 529; Chelan, Aug. 27, 1916, J. R. Weir 11224, Arth. Herb.; Spokane, Sept., 1919, J. R. Weir 11168, Arth. Herb.; Silverton, July 5, 1920, G. B. Posey & C. R. Stillinger 730, Wash. Ured. 842.

20. Melampsora lini (Pers.) Desmaz.

Pl. Crypt. (Fasc. 41) 2049, 1850.
Uredo miniata lini Pers. Syn. Fungi 216. 1801.
Uredo lini Schum. Enum. Pl. Saell. 2:230. 1803; N. Am. Flora 7:101. 1907.

On Linaceae: 0, I, II, III. Autoecious.

Linum lewisii Pursh. Pullman, July 14, 1899, R. M. Horner 1193, Herb. W.S.C.; Connell, June 30, 1923, G. L. Zundel, Wash. Ured. 1151.

21. Melampsora occidentalis Jackson.

Phytopath. 7:354, 1917; N. Am. Flora 7:666, 1924.

On Salicaceae: II, III. Heteroecious (0, I probably on Larix).

Populus angustifolia James. Seattle, 1906, Bonner 13. Comm. by J. G. Hambleton, Arth. Herb.; Puyallup, Oct., 1922, A. Frank 239, Wash. Ured. 432.

Populus balsamifera L. Bremerton, Sept. 23, 1912, E. Bartholomew, Barth. Fungi Columb. 4434, Barth. N. Am. Ured. 806.

Populus trichocarpa T. & G. Seattle, Oct. 8, 1892, A. M. Parker, also Oct. 3, 1913. Wash. Ured. 310; Bingen, Nov. 15, 1894. W. N. Suksdorf 497, Wash. Ured. 677; Waitsburg, Oct. 15, 1899, R. M.

Horner 1414, Herb. W.S.C.; Puyallup, Aug. 23, 1909 E. Bartholomew, Barth. Fungi Columb. 4143, also Oct. 20, 1916, A. Frank, Wash. Ured. 431; Spokane, Aug. 12, 1912, W. E. Flowers 6325, Wash. Ured. 2591; Longmire, Mt. Rainier (Recorded in Nat. Zeit. Forst. Landw. 12:90, 1914) C. Van Tubeuf; Locke, Aug. 20, 1915, W. E. Flowers 6421, Wash. Ured. 1154; Langley, Sept., 1919, J. M. Grant, Wash. Ured. 304; Index, Aug. 17, 1920, G. Sartoris, Wash. Ured. 172; Palouse, Sept. 15, 1920, G. B. Posey and C. R. Stillinger 774, Wash. Ured. 1091; Stevenson, Sept. 17, 1920, J. G. Boyce 671, Wash. Ured. 2858; Snoqualmie Falls, Nov. 10, 1923, Wash. Ured. 1272.

Populus sp. Darrington, Aug. 8, 1920, C. R. Stillinger, Wash. Ured. 1094.

There are three species of Melampsora found on Populus in the state of Washington: *M. albertensis* Arth. and *M. abietis-canadensis* (Farl.) Ludwig are apparently confined to *P. tremuloides* and *P. alba* respecitvely. *M. occidentalis* Jackson occurs on various other species of Populus and has been generally referred to *M. medusae* Thüm., but Jackson has clearly shown that it does not belong there (Phytopath. 7:353, 1917). "This species differs from all other species of Melampsora on Populus in the large size of the urediniospores which are only slightly flattened and are evenly verucose-echinulate. The teliospores are much longer than those of *M. medusae* and are thickened at the apex. The character of the telial sori suggests that this species may be closely allied to *M. albertensis.* The sori are much larger as are also both uredinio- and teliospores." (Jackson).

Melampsorella Schröter

22. **Melampsorella elatina** (A. & S.) Arth.

N. Am. Flora 7:111. 1907.
Aecidium elatinum Alb. & Schw. Consp. Fung. 121. 1805.
Melampsorella cerastii (Pers.) Schroet. Krypt. Flor. Schles. 3':366, 1887.

On Pinaceae: 0, I. Heteroecious.

Abies amabilis (Loud.) Forb. Mt. Rainier, (without a date), C. J. Kroebel, Arth. Herb.

Aibes grandis Lindl. Mt. Vernon, May, 1922, L. Sundquist, Wash. Ured. 977.

Abies lasiocarpa (Hook.) Nutt. Lake Chelan, Aug. 29, 1916, J. R. Weir, Barth. N. Am. Ured. 2022, Arth. Herb.; Locke, Aug. 10, 1917, W. E. Flowers 6061, Wash. Ured. 2540.

On CARYOPHYLLACEAE: II, III.

Cerastium viscosum L. Joyce, June 27, 1922. Wash. Ured. 984; Elwha, June 28, 1922, Wash. Ured. 986.

Stellaria borealis Bigel. Falcon Valley, July 31, 1885, W. N. Suksdorf 209, Wash. Ured. 556; Sedro-Woolley, Oct. 11, 1922, E. Bethel, Wash. Ured. 1165.

Stellaria media (L.) Cyr. Waitsburg, Mar. 31, 1900, R. M. Horner 1419, Herb. W.S.C.

This rust is probably more widely spread throughout the state than the above references would indicate. "It is remarkable in that both stages develop from a perennial mycelium. The aecial stage forms large or small witches' brooms on the branches of various species of Abies, each leaf of which bears the conspicuous aecia in two rows on the under surface of the leaves." (Jackson).

Melampsoridium Klebahn

23. **Melampsoridium betulae** (Schum.) Arth.

N. Am. Flora 7:110, 1907.
Melampsora betulina Tul. Ann. Sci. Nat. IV. 2:97, 1854.
Aecidium laricis Kleb. Zeits. Pflanzenkr. 9:18, 1899.
Peridermium laricis Arth. & Kern, Bull. Torrey Club 33:436, 1906.

On BETULACEAE: II, III. Heteroecious (0, I on Larix).

Betula glandulosa Michx. Falcon Valley, W. N. Suksdorf 15, Wash. Ured 502.

Milesia White

24. **Milesia polystichii** Wineland.

Brooklyn Bot. Gard. Mem. 1:214, 1918.

On POLYPODIACEAE: II. Heteroecious (0, I unknown).

Polystichum munitum (Kauf.) Presl. Lake Chelan, Aug. 25, 1916, J. R. Weir, 7534, Arth. Herb.; Sol Duc, July 14, 1921, J. R. Weir 19903, Arth. Herb.

There is some evidence that *Peridermium rugosum* Jackson may be the aecial stage of this rust. At least it might be worth while testing it by cultures.

Although only the uredinia of this rust have been found there seems little doubt but that it belongs to the genus Milesia (Milesina Magnus.) It is therefore placed here rather than in the genus *Uredo*, among the imperfect rusts.

Pucciniastrum Otth.

25. Pucciniastrum goodyerae (Tranz.) Arth.

N. Am. Flora 7:105, 1907.
Uredo goodyerae Tranz. Trudi S. Peterb. Obshch. Est. Otd. Bot. 23:28, 1893.

On Orchidaceae: II, III (0, I unknown).

Peramium decipiens (Hook.) Piper. Bingen, July 2, 1896, E. W. D. Holway, Arth. Herb., also W. N. Suksdorf 529, Wash. Ured. 678, also Nov. 5, 1898, W. N. Suksdorf 988, Wash. Ured. 748; Peter's Prairie, Sept. 16, 1902, W. N. Suskdorf 797, Wash. Ured. 727; Locke, June 11, 1915, W. E. Flowers 6173, Wash. Ured. 2568; Sol Duc Hot Springs, July 14, 1920, J. R. Weir and J. S. Boyce 618, Wash. Ured. 2852.

26. Pucciniastrum myrtilli (Schum.) Arth.

Result. Sci. Congr. Bot. Vienne 337, 1906; N. Am. Flora 7:109. 1907.
Aecidium ? myrtilli Schum. Enum. Pl. Saell. 2:227, 1803.
Pucciniastrum vacciniorum (DC) Dietel, in E. & P. Nat. Pfl. 1^{1**}:47. 1897.

On Vacciniaceae: II, III (0, I unknown).

Vaccinium caespitosum Michx. Falcon Valley, July 30, 1885, W. N. Suksdorf 202, Arth. Herb., Wash. Ured. 552; Chiquash Mts., Aug. 28, 1895, W. N. Suksdorf 1083, Wash. Ured. 780; Pullman, July 28, 1894, C. V. Piper 276, Wash. Ured. 2905; Locke, Sept. 20, 1915, W. E. Flowers 6334, Wash. Ured. 2596.

Vaccinium membranaceum Dougl. Skamania Co., Aug. 12, 1886, W. N. Suksdorf 335, Wash. Ured. 610; Paradise Valley, Mt. Rainier Aug. 24, 1901, E. D. W. Holway, N. Am. Ured. 1481, Arth. Herb.; Bellingham, June, 1913, J. R. Weir 81, Arth. Herb.; Locke, Sept. 20, 1915, W. E. Flowers 6334, Wash. Ured. 2596; Chelan, Aug. 26, 1916, J. R. Weir, Arth. Herb. Fungi Columb. 5083; Mt. Baldy, Aug. 11, 1923, A. J. Seltzer, Wash. Ured. 1212.

Vaccinium parvifolium Smith. Duckabush River, Aug. 12, 1914, E. Bartholomew, N. Am. Ured. 1182.

27. Pucciniastrum pustulatum (Pers.) Dietel.

E. & P. Nat. Pfl. 1^{1**}:47. 1897; N. Am. Flora 7:107. 1907.
Pucciniastrum epilobii Otth. Mitth. Nat. Ges. Bern 1861:72. 1861.
Pucciniastrum abieti-chamaenerii Kleb. Jahrb. Wiss. Bot. 34:387. 1900.

On Pinaceae: 0, I. Heteroecious.

Abies amabilis (Loud). Forb. Fairfax, J. S. Boyce 864, Aug. 20, 1921, Arth. Herb., Wash. Ured. 1333.

Abies grandis Lindl. Mt. Baker, Oct. 31, 1903, W. N. Suksdorf

965, Arth. Herb.; Locke, Aug. 15, 1917, W. E. Flowers 6040, Wash. Ured. 2537.

Abies lasiocarpa (Hook.) Nutt. Chiquash Mt., Aug. 11, 1886, W. N. Suksdorf 296, Wash. Ured. 1177; Lake Chelan, 1914, J. R. Weir 10891, Arth. Herb.; Lock, Aug. 15, 1917, W. E. Flowers 6370, Wash. Ured. 1125.

On ONAGRACEAE: II, III.

Epilobium adenocaulon Haussk. Bingen, Apr. 3, 1894, W. N. Suksdorf 396, Wash. Ured. 649; Pullman, July 28, 1899, R. M. Horner 1202, Herb. W.S.C.; Bainbridge Island, Aug. 4, 1909, Mr. and Mrs. E. Bartholomew, Arth. Herb.; Bremerton, Sept. 18, 1912, E. Bartholomew, Arth. Herb.; Spokane, Aug. 10, 1913, W. E. Flowers 6131, Wash. Ured. 2559; Kirkland, July 10, 1920, C. R. Stillinger 709, Wash. Ured. 817; Yarrow, Oct. 1, 1920, Grace Howard, Wash. Ured. 121; Houghton, Nov. 12, 1921, Wash. Ured. 237.

Epilobium angustifolium L. Seattle, Sept., 1892, C. V. Piper 219, Herb. W.S.C., Wash. Ured. 1292; Mt. Adams, Aug. 6, 1903, W. N. Suksdorf 968, Wash. Ured. 734; Indian Canyon, July 10, 1910, W. E. Flowers 6116, Wash. Ured. 2550; Bremerton, July 24, 1912, E. Bartholomew, Barth. N. Am. Ured. 1897, Arth. Herb.; Chimacum, July 26, 1915, D. C. George, Herb. W.S.C. 170, Wash. Ured. 2730; Locke, Aug. 15, 1917, W. E. Flowers 6335, Wash. Ured. 2597; Silverton, July 7, 1920, C. R. Stillinger 630, Wash. Ured. 807; Pendle, Aug. 3, 1920, J. S. Boyce 680, Wash. Ured. 2859; Carson, Sept. 16, 1920, J. S. Boyce 683, Wash. Ured. 2860; Pullman, Sept. 30, 1920, Herb. W.S.C. 739, Wash. Ured. 1124; Snoqualmie Falls, Oct. 24, 1920, Wash. Ured. 187; Yeomalt, Oct. 7, 1921, Wash. Ured. 214; Quilcene, Sept. 19, 1922, Wash. Ured. 1055; Port Townsend, Sept. 20, 1922, Wash. Ured. 1054; Port Angeles, Sept. 23, 1922, Wash. Ured. 1056; Crescent Lake, Sept. 24, 1922, Wash. Ured. 1057; Seabeck, Sept. 25, 1922, Wash. Ured. 1058.

Epilobium clavatum Trelease. Mt. Adams, July 5, 1900, W. N. Suksdorf 584, Wash. Ured. 699.

Epilobium paniculatum Nutt. Yarrow, Oct. 1, 1921, Grace Howard, Wash. Ured. 213.

Epilobium sp. Bingen, June 23, 1894, W. N. Suksdorf 396, Wash. Ured. 648.

The rust that occurs on *Epilobium angustifolium* has been shown both in Europe (Klebahn, Die Wirtsw. Rostpilze 393. 1904) and in America (Fraser, Mycol. 4:176, 1912 and Weir and Hubert, Phytopath. 6:373, 1916, and 7:109, 1917) to have its aecia on species of

Abies. Since no successful culture work has been conducted on any other species, the one occurring on *E. angustifolium* is, by some authors, separated from *P. pustulatum* under the name *P. abieti-chamaenerii* Kleb. For the purpose of this list it seems best to make the above disposition.

28. Pucciniastrum pyrolae (Pers.) Dietel.

E. & P. Nat. Pfl. 1^{1**}:47, 1897; N. Am. Flora 7:108, 1907.
Aecidium pyrolae Pers. Gmel. Syst. Nat. 2:1473, 1791.
Uredo chimaphilae Peck, Ann. Rep. N. Y. State Mus. 46:33, 1893.

On Pyrolaceae: II, III (0, I unknown).

Chimaphila umbellata (L.) Nutt. Chiquash Mts., July 20, 1894, W. N. Suksdorf 452, Wash. Ured. 665; Mt. Adams, July 27, 1895, W. N. Suksdorf 1082, Wash. Ured. 779.

Pyrola secunda L. Mt. Adams, Aug. 17, 1885, W. N. Suksdorf 213, Arth. Herb., Wash. Ured. 560; Pullman, June 30, 1915, F. D. Heald and D. C. George, Herb. W.S.C. 56.

29. Pucciniastrum sparsum (Wint.) Ed. Fisch.

Beitr. Krypt. Schweiz. 2^{2}:469, 1904; N. Am. Flora 7:108, 1907.
Melampsora sparsa Wint. in Rab. Krypt. Fl. 1^{1}:245, 1881.
Uredo arbuti Dietel & Holway, Bot. Gaz. 18:256, 1893.
Pucciniastrum arbuti Dietel & Holway, in E. & P. Nat. Pfl. 1^{1**}:47, 1897.
Uredo copelandi Sydow, Ann. Myc. 2:31, 1904.

On Ericaceae: II, III (0, I unknown).

Arbutus menziesii Pursh. Bainbridge Island, Aug. 17, 1909, E. Bartholomew 3181, Arth. Herb.; Bremerton, Sept. 18, 1912, E. Bartholomew, Arth. Herb.; Seattle, Oct. 15, 1919, Wash. Ured. 335, also Sept. 17, 1920, W. E. Flowers 6333, Wash. Ured. 1175; Charleston, May 22, 1921, Grace Howard, Wash. Ured. 197; Winslow, June 15, 1921, Wash. Ured. 1176.

Arctostaphylos columbiana Piper. Olympic Mts., Sept. 17, 1920, W. E. Flowers 6371, Wash. Ured. 1128.

Uredinopsis Magn.

30. Uredinopsis atkinsonii Magn.

Hedwigia 43:123. Mar. 1904; N. Am. Flora 7:117, 1907.
Peridermium balsameum Peck, Rept. N. Y. State Mus. 27:104, 1875.
Uredinopsis copelandii Sydow, Ann. Myc. 2:34, Feb. 1904; N. Am. Flora 7:116, 1907.

On Pinaceae: 0, I. Heteroecious.

Abies grandis Lindl. Mt. Adams, Oct. 31, 1903, W. N. Suksdorf 965, Wash. Ured. 731; Silverton, July 8, 1920, C. R. Stillinger

739, Wash. Ured. 841; Elbe, July 27, 1921, J. S. Boyce 862, Arth. Herb., Wash. Ured. 1332.

Abies lasiocarpa (Hook.) Nutt. Chiquash Mts., Aug. 11, 1886, W. N. Suksdorf 296, Wash. Ured. 1177.

Abies nobilis Lindl. Cascade Mts., Snohomish Co., Aug., 1915, H. Schmitz, Arth. Herb.; Elwha Valley, Clallam Co., Aug., 1919, A. Curtis, Wash. Ured. 329.

On POLYPODIACEAE: II, III.

Athyrium cyclosorum Rupr. Manette, Aug. 17, 1912, E. Bartholomew, Barth. Fungi Columb. 4491, Arth. Herb.; Bellingham, June, 1913, J. R. Weir 43, Arth. Herb.; Locke, Aug. 30, 1915, W. E. Flowers 6107, Wash. Ured. 1134; Lake Chelan, Aug. 26, 1916, J. R. Weir, 14439, Arth. Herb.; Silverton, July 6, 1920, C. R. Stillinger 533, Wash. Ured. 804.

The different species belonging to the genus Uredinopsis seem to be separated on rather slight morphological characters. This is particularly true in connection with *U. copelandii* Sydow and *U. atkinsonii* Magn. and no attempt has been made to separate them.

31. Uredinopsis pteridis Diet. & Holw.

Ber. Deuts. Bot. Ges. 13:331, 1895; N. Am. Flora 7:116, 1907.
Aecidium pseudo-balsameum Diet. & Holw., Erythea 7:98, 1899.
Peridermium pseudo-balsameum Arth. & Kern., Bull. Torrey Club 33:430, 1906.

On PINACEAE: 0, I. Heteroecious.

Abies grandis Lindl. Falcon Valley, Aug. 3, 1907, W. N. Suksdorf 1057, Wash. Ured. 756; Locke, Aug. 5, 1915, W. E. Flowers 6132, Wash. Ured. 1132; Lucerne, Aug. 25, 1916, J. R. Weir, Barth. N. Am. Ured. 1619, Arth. Herb.; Castle Pt., June 19, 1919, L. Hartge, Wash. Ured. 1013; Friday Harbor, Aug., 1922, L. Hartge, Wash. Ured. 1012.

On POLYPODIACEAE: II, III.

Pteridium aquilinum pubescens Und. Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, Arth. Herb.; Port Orchard, July 23, 1912, E. Bartholomew, Barth. N. Am. Ured. 1383, Barth. Fungi Columb. 4492, Arth. Herb.; Locke, Aug. 15, 1915, W. E. Flowers 6133, Wash. Ured. 1133; Piedmont, July 15, 1920, J. S. Boyce 601, Wash. Ured. 2851.

It is worthy of note that the aecial stage of all recorded species of Uredinopsis occurs on Abies.

PUCCINIACEAE

Teliospores stalked, usually free but sometimes fascicled, wall firm or with an outer gelatinous layer, each spore composed of one or more cells arranged in rows or groups; basidiospores formed on a promycelium or external basidium. Aecia with or without peridia; urediniospores borne singly on pedicels.

A. Teliospores of one or two cells.

B. Teliospores one-celled, borne singly on pedicels.

C. Pycnia subcuticular, ostiolar filaments wanting; teliospores flattened above and below; life cycle 0, II, III. Pileolaria (p. 306).

CC. Pycnia subepidermal, deep-seated with protruding ostiolar filaments; only one species with the life cycle 0, II, III reported from Washington. Uromyces (p. 361).

BB. Teliospores of two cells.

D. Teliospores embedded in gelatine, mostly on Gymnosperms, urediniospores usually wanting. Gymnosporangium (p. 299).

DD. Teliospores free, usually on Angiosperms.

E. Teliospores with a more or less evident gelatinous layer, pores more than one placed laterally. Uropyxis (p. 373).

EE. Teliospores without gelatinous layer, with one apical pore in each cell.

F. Aecia with peridia; pycnia subepidermal. Puccinia (p. 306).

FF. Aecia without peridia; pycnia subcuticular. Gymnoconia (p. 299).

AA. Teliospores of more than two cells, occasionally with only two.

G. Teliospores two to several cells in series. Phragmidium (p. 302).

GG. Teliospores with three radiating cells; two pores in each cell. Nyssopsora (p. 302).

Gymnoconia Lagerh.

32. Gymnoconia interstitialis (Schlecht.) Lagerh.

Tromsö Mus. Aarsh. 16:140, 1894; N. Am. Flora 7:180, 1912.
Caeoma (Uredo) interstitiale Schlecht. Horae Phys. Berol. 96. 1820.
Caeoma nitens Burrill, Bull. Ill. Lab. Nat. Hist. 2:220. 1885.

On Rosaceae: 0, I, III. Autoecious.

Rubus macropetalus Dougl. Monroe, July, 1921, Wash. Ured. 286; Puyallup, July 24, 1921, A. Frank, Wash. Ured. 414.

Rubus nigrobaccus Bailey. Spokane, June 28, 1895, C. V. Piper, Herb. W.S.C., Wash. Ured. 1288; Almonta, 1895, G. H. Watt, Herb. W.S.C.; Monroe, A. Frank D136.

Rubus strigosus Michx. Everett, May 17, 1915, J. H. Brislawn, Wash. Ured. 74; Locke, May 30, 1915, W. E. Flowers 6320, Wash. Ured. 2586.

According to Kunkel's investigation on this rust there are in North America two rusts on Rubus both of which have been commonly referred to *Gymnoconia interstitialis* or *Caeoma nitens* (Bull. Torrey Club 43:559-569, 1916). One of these is a short-cycled form which Arthur has named *Kunkelia nitens* (Bot. Gaz. 63:504, 1917).

It is probable that the rust found in Washington has a short cycle and therefore belongs to the latter species but it seems to suit the purposes of the present list best to retain the old name.

Gymnosporangium Hedw. f.

33. Gymnosporangium betheli Kern

Bull. Torrey Club 34:459, 1907; N. Am. Flora 7:204, 1912.
Roestelia betheli Kern Bull. Torrey Club 34:461, 1907.

On Rosaceae: 0, I. Heteroecious.

Crataegus douglasii Lindl. Spokane, Aug. 28, 1898, C. V. Piper 549, Arth. Herb., Wash. Ured. 1232; Republic, Sept. 14, 1923, G. L. Zundel, Wash. Ured. 1225.

On Pinaceae: III.

Juniperus scopulorum Sarg. Spokane, July 2, 1896, C. V. Piper 439, Wash. Ured. 1233; also Aug. 5, 1917, C. H. Shattuck, Arth. Herb.; Walla Walla, June 1, 1920, J. R. Weir 4570, Arth. Herb.; Friday Harbor, July 19, 1922, L. Hartge, Wash. Ured. 1282.

The telia have been found on *J. occidentalis* in Oregon. The species seems to be limited to the Pacific Northwest.

34. Gymnosporangium juniperinum (L.) Mart.

Fl. Crypt. Erlang. 333. 1817; N. Am. Flora 7:199, 1912.
Tremella juniperina L. Sp. Pl. 1157, 1753.

On Rosaceae: 0, I (III on Juniperus).

Pyrus occidentalis Wats. Lake Keechelus, Sept., 1915, Arth. Herb.

Pyrus sitchensis (Roem.) Piper. Skamania Co., Sept. 1, 1893, W. N. Suksdorf 255, Wash. Ured. 579, Arth. Herb.; Locke, Aug. 21, 1915, W. E. Flowers 6406, Wash. Ured. 1250.

Pyrus sp. Mt. Adams, Sept. 3, 1900, W. N. Suksdorf.

"This species is known in America only from the Rocky and Cascade Mountains of the United States and Canada." Jackson.

35. Gymnosporangium juvenescens Kern

Bull. N. Y. Bot. Gard. 7:448, 1911; N. Am. Flora 7:193, 1912.

On Rosaceae: 0, I (III on Juniperus).

Amelanchier alnifolia Nutt. Spokane, Sept. 20, 1913, W. E. Flowers 6319, Wash. Ured. 2585; also Sept., 1916, J. R. Weir 11216, Arth. Herb.; Chelan, Aug., 1916, J. R. Weir 11170, Arth. Herb.

This species causes witches' brooms on the telial host, resembling somewhat those produced by *G. nidus-avis* Thax. in the eastern United States.

36. Gymnosporangium koreaense (P. Henn.) Jackson

Jour. Agr. Research 5:1006, 1916.
Roestelia koreaensis P. Henn. in Warburg, Monsunia 1:5, 1899.
Gymnosporangium asiaticum Miyabe, Bot. Mag. Tokio 17:34, 1903. (*Hyponym.*)
Gymnosporangium haraeanum Syd. Am. Myc. 10:405, 1912.
Gymnosporangium chinense Long. Jour. Agr. Research 1:353, 1914.

On Pinaceae: III (0, I on Rosaceae).

Juniperus chinensis L. Seattle, May 19, 1915, Wash. Ured. 334.

This species was found on shrubs imported from Japan. In Oregon, Jackson has grown it on *Pyrus sinensis* and *Cydonia vulgaris*, producing aecia.

37. Gymnosporangium nelsoni Arth.

Bull. Torrey Club 28:665, 1901; N. Am. Flora 7:207, 1912.
Roestelia nelsoni Arth. Bull. Torrey Club 28:665, 1901.
Aecidium nelsoni Farl. Bibl. Index 1:68, 1905.
Gymnosporangium durum Kern Bull. Torrey Club 34:460, 1907.

On Rosaceae: 0, I (III on Juniperus).

Pyrus diversifolia Bong. Tulalip, Aug. 21, 1920, Wash. Ured. 291; Marysville, Aug. 21, 1921, Wash. Ured. 173.

Pyrus occidentalis S. Wats. Mt. Adams, 1896, W. N. Suksdorf 1084, Wash. Ured. 781.

The telial stage produces conspicuous galls on the branches of Juniperus.

38. Gymnosporangium nootkatensis (Trel.) Arth.

Am. Jour. Bot. 3:44, 1916.
Uredo nootkatensis Trelease, Alaska Harr. Exped. 5:36, 1904.
Aecidium sorbi Arth. Bull. Torrey Club 33:521, 1906.
Gymnosporangium sorbi (Arth.) Kern, Bull. N. Y. Bot. Gard. 7:438, 1911; N. Am. Flora 7:190, 1912.
Uredo chamaecyparidis-nutkaensis Tubeuf, Nat. Zeits. Forst. Landw. 2:91, 1914.

On Rosaceae: 0, I. Heteroecious.

Amelanchier florida Lindl. Glacier, July 7, 1920, C. R. Stillinger 752, Wash. Ured. 1082.

Pyrus diversifolia Bong. Silverton, July 5, 1920, C. R. Stillinger 740, Wash. Ured. 843.

Pyrus occidentalis S. Wats. Mt. Rainier, Sept. 11, 1893, J. A. Allen, Arth. Herb.; Olympic Mts., Clallam Co., June, 1900, A. D. Elmer, Arth. Herb.; Goat Mt., near Mt. Rainier, Aug. 24, 1901, E. W. D. Holway, Arth. Herb.; Olympic Mts., Queets River Valley, Jefferson Co., Aug. 15, 1907, T. C. Frye, Arth. Herb., Wash. Ured. 87; Glacier, Aug. 31, 1920, F. G. Renner, Wash. Ured. 362; Index, Aug. 1921, F. G. Renner, Wash. Ured. 200.

Pyrus sitchensis (Roem.) Piper. Skamania Co., Aug. 10, 1886, W. N. Suksdorf, Wash. Ured. 795; Mt. Adams, Sept. 21, 1911, W. N. Suksdorf 1095, Wash. Ured. 1226; Silverton, July 7, 1920, G. B. Posey and C. R. Stillinger 718, Wash. Ured. 824; Dosewallips River, Aug., 1920, G. Howard, Wash. Ured. 179; Skykomish, Aug. 11, 1923, A. J. Seltzer, Wash. Ured. 1187.

On Pinaceae: II, III.

Chamaecyparis nootkatensis (Lamb.) Spach. Mt. Rainier, Aug., 1913, C. von Tubeuf, Arth. Herb.; Silverton, July 8, 1920, G. B. Posey and C. R. Stillinger 738, Wash. Ured. 840.

This is the only Gymnosporangium that develops urediniospores.

39. Gymnosporangium tubulatum Kern

Bull. N. Y. Bot. Gard. 7:451, 1911; N. Am. Flora 7:195, 1912.
Roestelian tubulata Kern, Bull. Univ. Mont. 61:64, 1910.

On Rosaceae: 0, I. Heteroecious.

Crataegus douglasii Lindl. Spokane, Sept. 10, 1907, W. E. Flowers 6322, Wash. Ured. 2588.

On Pinaceae: III.

Juniperus scopulorum Sarg. Spokane, July 12, 1907, W. E. Flowers 6323, Wash. Ured. 2589.

Nyssopsora Arthur

40. Nyssopsora echinata (Liv.) Arth.

Result. Sci. Congr. Bot. Vienne 342, 1906; N. Am. Flora 7:179, 1912.
Triphragmium echinatum Liv. Ann. Sci. Nat. *III.* 9:247, 1848.

On Umbelliferae: 0, III.

Ligusticum purpureum C. & R. Mt. Adams, July 14, 1900, W. N. Suksdorf 599, Ellis N. Am. Ured. 1512, Arth. Herb., Wash. Ured. 712; Paradise Valley, Mt. Rainier, May, 1911, E. W. D. Holway, Arth. Herb.

Oenanthe sarmentosa Presl. Port Orchard, July, 1895, C. V. Piper 425, Wash. Ured. 1201; Ilwaco, September, 1922, E. Bethel; Winslow, June 9, 1923, Wash. Ured. 1810.

Phragmidium Link

41. Phragmidium biloculare Diet. & Holw.

Bot. Gaz. 19:305, 1894.
Gymnoconia bilocularis Arth. Result. Sci. Congr. Bot. Vienne 342, 1906.
Earlea bilocularis (Diet. & Holw.) Arth. N. Am. Flora 7:177, 1912.

On Rosaceae: 0, I, III. Autoecious.

Potentilla flabellifolia Hook. Chiquash Mts., Aug. 18, 1892, W. N. Suksdorf 351, Arth. Herb., Wash. Ured. 615; Mt. Adams, Sept. 17, 1894, W. N. Suksdorf, 392, Arth. Herb., Wash. Ured. 643; Paradise Valley, Mt. Rainier, Aug. 24, 1901, E. W. D. Holway, N. Am. Ured. 1410, Arth. Herb.

Potentilla nuttallii Lehm. Wawawai, April 23, 1913, J. G. Hall, Arth. Herb.

42. Phragmidium disciflorum (Tode) J. F. James

Contr. U. S. Nat. Herb. 3:276, 1895; N. Am. Flora 7:171, 1912.
Ascophora disciflora Tode, Fungi Meckl. 1:16, 1790.
Phragmidium mucronatum Schlecht. Fl. Berol. 2:156, 1824.

Phragmidium oblongum Bon. Coniom. 60, 1860.
Sacc. Syll. 7:746, 1888.
Phragmidium subcorticum (Schr.) Wint. in Rab. Krypt. Fl. 1¹:228, 1881;

On ROSACEAE: 0, I, II, III. Autoecious.

Rosa sps. (Cultivated). Seattle, Aug. 26, 1914, Wash. Ured. 101; Tacoma, Aug. 26, 1920, Wash. Ured. 1314; Olympia, Aug. 4, 1922, Wash. Ured. 1315.

This species occurs in the United States only on cultivated roses, especially those having large and firm leaves. It is a native of Europe and probably was introduced into this country on cuttings.

43. Phragmidium imitans Arth.

N. Am. Flora 7:165, 1912.
Phragmidium incrassatum gracile Farl.,Ellis. N. Am. Fungi 282, hyponym, 2879.
Phragmidium gracile Arth. Bull. Iowa Agr. Coll. Dept. Bot. 1884; 161, 1884. Not *P. gracile* Cooke, 1871,

On ROSACEAE: 0, I, II, III. Autoecious.

Rubus leucodermis Dougl. White Salmon River, Oct. 5, 1894, W. N. Suksdorf 415, Wash. Ured. 664; Paradise Valley, Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, Arth. Herb.; Duckabush River, Aug. 9, 1912, E. Bartholomew, Barth. Fungi Columb. 4445, N. Am. Ured. 1214, Arth. Herb.

Rubus strigosus Michx. Cheney, June 30, 1895, S. Tucker 133, Arth. Herb.; Sumner, June, 1914, H. L. Rees, Arth. Herb.; Arlington, July 23, 1915, F. D. Heald, Arth. Herb.; Locke, Aug. 15, 1916, W. E. Flowers 6324, Wash. Ured. 2590; Coupeville, Sept. 8, 1919, Wash. Ured. 1168; Snohomish, July 27, 1920, F. G. Renner, Arth. Herb.; Stampede, Aug., 1920, F. G. Renner, Wash. Ured. 1170; Lacey, Aug. 28, 1920, Wash. Ured. 333; Bellevue, Aug. 19, 1921, A. Frank, Wash. Ured. 403; Olympia, Aug., 1921, A. Frank 225, Wash. Ured. 402; Puyallup, Aug. 19, 1921, A. Frank, Wash. Ured. 401; Ferndale, Sept. 19, 1921, G. L. Zundel, Wash. Ured. 1135; Tacoma, Oct. 8, 1921, E. Daniels, Wash. Ured. 1169; Puyallup, June 6, 1922, G. L. Zundel, Herb. W. S. C. 1018, Wash. Ured. 2812; Bay Center, Aug. 24, 1922, Wash. Ured. 1029; Ilwaco, Aug. 26, 1922, Wash. Ured. 1031; Raymond, Aug. 29, 1922, Wash. Ured 1032; Silverdale, Sept. 27, 1922, Wash. Ured. 1061; Tracyton, Sept. 27, 1922, Wash. Ured. 1060; Poulsbo, Sept. 27, 1922, Wash. Ured. 1062; Kingston, Sept. 27, 1922, Wash. Ured. 1059; Ferncliff, Sept. 28, 1922, Wash. Ured. 1063; Port Blakeley, Sept. 29, 1922, Wash. Ured. 1065; Rolling Bay, Sept. 29, 1922, Wash. Ured. 1064; Seattle, Oct. 10, 1922, Wash. Ured. 1071.

44. Phragmidium ivesiae Sydow

Ann. Myc. 1:329. 1903; N. Am. Flora 7:174, 1912.
Uredo acaenae Ellis & Ev. N. Am. Fungi 3151, hyponym, 1894.
Phragmidium affine Sydow, Ann. Myc. 2:29, 1904.

On Rosaceae: 0, I, II, III. Autoecious.

Potentilla blaschkeana Turez. (*P. flabelliformis* Lehm.) Pullman, Aug. 8, 1893, C. V. Piper 124, Arth. Herb., Wash. Ured. 2902; also July 20, 1915, D. C. George, Herb. W.S.C. 116, Wash. Ured. 2718; Spokane, June 29, 1884, W. N. Suksdorf 322, Barth. N. Am. Ured. 721, Arth. Herb.

Potentilla nuttallii Lehm. Pullman, July 2, 1898, C. V. Piper 398, Wash. Ured. 1265.

Potentilla villosa Pall. Silverton, July 8, 1920, C. R. Stillinger 717, Wash. Ured. 823.

45. Phragmidium montivagum Arth.

Torrey 9:24, 1909; N. Am. Flora 7:169, 1912.

On Rosaceae: 0, I, II, III. Autoecious.

Rosa gymnocarpa Nutt. Spokane, June 12, 1912, W. E. Flowers 6128, Wash. Ured. 2558; Locke, Sept. 1, 1918, W. E. Flowers 6167, Wash. Ured. 2565.

Rosa nutkana Presl. Spokane, June 11, 1919, W. E. Flowers 7791, Wash. Ured. 2603; Locke, Aug. 15, 1916, W. E. Flowers 6400, Wash. Ured. 2601.

Rosa rubiginosa L. Winslow, Oct. 30, 1921, Wash. Ured. 220; Rolling Bay, Oct. 30, 1921, Wash. Ured. 219.

Rosa sp. Spokane, Sept., 1919, J. R. Weir 11169 and 11180, Arth. Herb.; Chelan, Sept., 1919, J. R. Weir 11167 and 11239, Arth. Herb.

46. Phragmidium occidentale Arth.

Earle, in Greene Pl. Baker 2:3, 1901; N. Am. Flora 7:166, 1912.

On Rosaceae: 0, I, II, III. Autoecious.

Rubus parviflorus Nutt. White Salmon River, May 30, 1883, W. N. Suksdorf 61, Wash. Ured. 514; Blue Mts., July 4, 1892, E. R. Lake and W. R. Hull, Wash. Ured. 105; Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, Arth. Herb.; Duckabush River, Aug. 9, 1912, E. Bartholomew, Barth. Fungi Columb. 4446, Arth. Herb.; Spokane, June 25, 1914, W. E. Flowers 6161, Wash. Ured 2563; also July 21, 1919, C. R. Stillinger 397, Wash. Ured. 803; Chiwaukum, July 26, 1915, D. C. George, Herb. W. S. C. 167, Wash. Ured. 2729; Locke,

Aug. 15, 1916, W. E. Flowers 6107, Wash. Ured. 2548; Olympic Mts., July 14, 1919, G. Howard, Wash. Ured. 331; Hoquiam, July 2, 1920, C. R. Stillinger 756, Wash. Ured. 1086; Silverton, July 5, 1920, C. R. Stillinger 727, Wash. Ured. 832; Mt. Vernon, May, 1922, L. Sundquist, Wash. Ured. 968; Langley, June 15, 1922, A. Reuter, Wash. Ured. 980; Clallam Bay, Sept. 23, 1922, Wash. Ured. 1067; Forks, Sept. 24, 1922, Wash. Ured. 1066; Port Townsend, Sept. 26, 1922, Wash. Ured. 1171; Snoqualmie Falls, Nov. 10, 1923, Wash. Ured. 1273.

47. Phragmidium potentillae (Pers.) P. Karst.

Bidr. Finl. Nat. Folk 31:49, 1879; N. Am. Flora 7:174, 1912.
Puccinia potentillae Pers. Syn. Fung. 229, 1801.
Phragmidium obtusum Schmidt & Kunze, Deuts. Schwämme 5:5, 1816.
Caeoma potentillae Schlecht. Fl. Berol. 2:121, 1824.

On Rosaceae: 0, I, II, III. Autoecious.

Potentilla biennis Greene. Pullman, July 11, 1920, G. L. Zundel, Arth. Herb., Wash. Ured. 287.

Potentilla gracilis Dougl. Spangle, June 29, 1884, W. N. Suksdorf 145, Arth. Herb., Wash. Ured. 526; Falcon Valley, Sept. 2, 1894, W. N. Suksdorf 410, Arth. Herb., Wash. Ured. 660; Pullman, July 18, 1899, R. M. Horner 1221, Herb. W. S. C.

48. Phragmidium rosae-californicae Dietel

Hedwigia 44:125, 1905; N. Am. Flora 7:170, 1912.

On Rosaceae: 0, I, II, III. Autoecious.

Rosa gymnocarpa Nutt. Nisqually River, Pierce Co., July 7, 1894, O. D. Allen 72, Arth. Herb.; Mt. Rainier, Aug. 24, 1901, E. W. D. Holway, N. Am. Ured. 1423, Arth. Herb.; Friday Harbor, June 13, 1903, T. C. Frye, Arth. Herb., Wash. Ured. 106; Pullman, July 18, 1915, F. D. Heald, Arth. Herb.; Harrington, June 6, 1919, C. R. Stillinger, Arth. Herb.

Rosa nutkana Presl. Seattle, Oct., 1891, C. V. Piper 23, Arth. Herb., Wash. Ured. 1313; Poulsbo, Aug. 9, 1909, E. Bartholomew, Barth. Fungi Columb. 3157, Arth. Herb.; Port Orchard, Aug. 1, 1912, E. Bartholomew, Barth. N. Am. Ured. 1019, Arth. Herb.; Cook, June 21, 1915, J. M. Jessup, Arth. Herb.; Silverton, July 8, 1920, C. R. Stillinger 726, Wash. Ured. 831; Tulalip, Aug. 21, 1920, Wash. Ured. 176; Langely, Sept., 1921, J. M. Grant, Wash. Ured. 297; Winslow, Oct. 9, 1921, Wash. Ured. 332; Mt. Vernon, May, 1922, L. Sundquist, Wash. Ured. 966.

Rosa pisocarpa Gray. Bainbridge Island, July 27, 1909, E. Barth-

olomew, Barth. Fungi Columb. 3158, Arth. Herb.; Wenatchee, July 15, 1912, E. Bartholomew, N. Am. Ured. 811, Arth. Herb.; Houghton, Nov. 12, 1921, Wash. Ured. 260; Medina, Nov. 12, 1921, Wash. Ured. 241; Kirkland, Nov. 12, 1921, Wash. Ured. 243; Winslow, June 28, 1922, Wash. Ured. 985.

Rosa sp. Bingen, July 5, 1886, W. N. Suksdorf 261, Wash. Ured. 583; Pullman, July 18, 1915, F. D. Heald and C. Sax, Herb. W. S. C. 150, Wash. Ured. 1180; Nespelem, B. F. Dana, Sept. 20, 1915, Herb. W. S. C. 372, Wash. Ured. 1181; Sumner, June 7, 1916, A. Frank 185, Wash. Ured. 438; Puyallup, Oct. 1, 1916, A. Frank 309, Wash. Ured. 435; Coupeville, June 16, 1919, A. Frank 61, Wash. Ured. 437.

49. **Phragmidium speciosum** Cooke

Grevillea 3:171, 1875.
Aregma speciosa Fr. Syst. Myc. 3:496, 1832.
Earlea speciosa (Fr.) Arth. Result. Sci. Congr. Bot. Vienne 341, 1906; N. Am. Flora 7:175, 1912.

On Rosaceae: 0, I, III. Autoecious.

Rosa pisocarpa Gray. Columbia River, Klickitat Co., Aug. 21, 1885, W. N. Suksdorf 233, Arth. Herb., Wash. Ured. 561; Pullman, Oct. 25, 1894, C. V. Piper 479, Arth. Herb., Wash. Ured. 2911.

Rosa sp. Pullman, Mar. 28, 1922, B. F. Dana, Herb. W. S. C. 980, Wash. Ured 2806.

Pileolaria Cast.

50. **Pileolaria toxicodendri** (Berk. & Rav.) Arth.

N. Am. Flora 7:147, 1907.
Uromyces toxicodendri Berk. & Rav., Grevillea 3:56, 1874.
Pileolaria brevipes Berk. & Rav., Grevillea 3:58, 1874.
Uromyces punctata-striatum Cooke & Hark., Grevillea 14:8, 1885.
Uromyces brevipes Holway, Bot. Gaz. 24:24, 1897.

On Anacardiaceae: 0, II, III. Autoecious.

Rhus toxicodendron L. Yakima, July 23, 1915, Arth. Herb., Wash. Ured. 97.

Puccinia Pers.

51. **Puccinia aberrans** Peck

Bot. Gaz. 4:217, 1879.
Micropuccinia aberrans (Peck) Arth. & Jackson, N. Am. Flora 7:533, 1922.

On Cruciferae: 0, III.

Smelowskia calycina Mey. Glacier Peak, Aug. 15, 1921, H. St. John, Herb. W. S. C. 950, Wash. Ured. 2805.

52. Puccinia absinthii (Hedw. f.) DC.

Fl. Fr. 6:56, 1815.
Uredo (*Puccinia*) *absinthii* Hedw. f., in Lam. Encycl. Meth. Bot. 8:245, 1808. 8:245, 1808.
Puccinia artemisiae Fuckel, Jahrb. Nass. Ver. Nat. 23-24:55, 1870.
Puccinia similis E. & E. Bull. Torrey Club 25:508, 1898.
Bullaria absinthii (Hedw. f.) Arth. & Mains, N. Am. Flora 7:508, 1922.

On COMPOSITAE: 0, II, III.

Artemisia dracunculoides Pursh. Bingen, Sept. 16, 1893, W. N. Suksdorf 252, Arth. Herb., Wash. Ured. 576; Waitsburg, May 26, 1900, R. M. Horner 1464, Herb. W.S.C.; Wawawai, Nov. 28, 1902, C. V. Piper, Arth. Herb.

Artemisia ludoviciana Nutt. Spokane, C. V. Piper 753, Arth. Herb.; Hillyard, Sept. 20, 1914, W. E. Flowers 6038, Wash. Ured. 2535.

Artemisia rigida (Nutt.) Gray. Spangle, Aug., 1899, W. N. Suksdorf 348; Wawawai, Oct. 3, 1902, C. V. Piper, Arth. Herb.

Artemisia tridentata Nutt. Bingen, June 28, 1902, W. N. Suksdorf 791, Wash. Ured. 729; Wenatchee, July 15, 1912, E. Bartholomew, Barth. Fungi Columb. 4450, Barth. N. Am. Ured. 1216, Arth. Herb.; Yakima, Aug., 1915, Wash. Ured. 77.

There are only two speceis of rust found in Washington having telia on Artemisia, the above species, which is a brachy-form, and *P. millefolii* (Cf. 131), a micro-form. The teliospores of these two species are quite similar and might easily be confused if only telia were present. Artemisia is also the aecial host of P. *universalis*.

53. Puccinia abundans (Pk.) Jackson

Brooklyn Bot. Gard. Mem. 1:229, 1918.
Aecidium abundans Pk. Bot. Gaz. 3:34, 1878.
Puccinia crandallii Pam. & Hume, Proc. Davenport Acad. Sci., 7:250, 1899.
Puccinia kreageri Ricker, Jour. Myc. 11:114, 1905.
Dicaeoma abundans (Pk.) Arth. & From., N. Am. Flora 7:328, 1920.

On CAPRIFOLIACEAE: 0, I. Hetereocious.

Symphoricarpos racemosus Michx. Falcon Valley, May 29, 1882, W. N. Suksdorf 14, Wash. Ured. 501; Pullman, June 2, 1894, C. V. Piper 182, Herb. W. S. C., Wash. Ured. 1287; also May 24, 1921, C. S. Parker, Herb. W.S.C. 768, Wash. Ured. 2777; Kalama, June 18, 1911, T. C. Frye, Wash. Ured. 339; Spokane River, June 10, 1914, W. E. Flowers 6289, Wash. Ured. 2580; Spokane, Aug. 15, 1914, W. E. Flowers 601, Wash. Ured. 2510; Friday Harbor, June 29, 1919, G. Howard, Wash. Ured. 133; Black Diamond, July 2, 1922, A. J. Seltzer, Wash. Ured. 990.

Symphoricarpos sp. Bingen, June 28, 1900, W. N. Suksdorf 590, Wash. Ured. 705; Flat Top Island, July 6, 1919, G. Howard, Wash. Ured. 1188.

On Poaceae: II, III.

Festuca subulata Trin. Clark Spring, June 26, 1902, F. O. Kreager, Arth. Herb.

54. Puccinia albulensis P. Magn.

Ber. Deuts. Bot. Ges. 7:169, 1890.
Puccinia veronicae Schum., Hedwigia 19:164, 1880. Not *P. veronicae* Schroet., 1879.
Micropuccinia albulensis (P. Magn.) Arth. & Jackson, Bull. Torrey Club 48:42, 1921; N. Am. Flora 7:566, 1922.

On Scrophulariaceae: 0, III.

Veronica cusickii Gray. Mt. Rainier, Aug. 22, 1901, E. W. D. Holway, Arth. Herb.

Vernoica scutellata L. Mt. Adams, W. N. Suksdorf 367, Wash. Ured. 623.

55. Puccinia allii (DC.) Rudolphi

Linnaea 1:392, 1829.
Xyloma allii DC. Fl. Fr. 6:156, 1815.
Puccinia alliorum Corda, Ic. Fung. 4:12, 1840.
Puccinia rotundata Bon. Abh. Nat. Ges. Halle 5:219, 1860.
Puccinia blasdalei Dietel & Holway; Dietel, Erythea 1:248, 1893.
Dicaeoma allii (DC.) Kuntze, Rev. Gen. 3^3:467, 1898; N. Am. Flora 7:373, 1920.

On Liliaceae: 0, I, II, III. Autoecious.

Allium acuminatum Hook. Pullman, June 28, 1893, C. V. Piper, Phanerogamic specimen 1885, Torrey Herb. N. Y. Bot. Garden, Arth. Herb.; also F. L. Pickett, Herb. W. S. C. 356, Wash. Ured. 2755; Bingen, June 2, 1894, W. N. Suksdorf 382, N. Am. Ured. 18, Arth. Herb., Wash. Ured. 631; Rockland, Apr. 18, 1901, W. N. Suksdorf 647, Arth. Herb., Wash. Ured. 721; Spokane, Aug. 12, 1914, W. E. Flowers 6140, Wash. Ured. 1152; Colfax, May 1, 1922, C. S. Parker, Herb. W. S. C. 911, Wash. Ured 2807.

"This rust may be distinguished from other Allium rusts by the strongly developed stroma in the telial sori, and the tendency to form confluent telia covering large areas on the stems and leaves. The teliospores are large (16-26 by 40-61 μ), thickened to 4-10 μ at the apex." Jackson.

56. Puccinia ambigua (Alb. & Schw.) Lagerh.

Bubäk Sitz. -ber. Böhm. Ges. Wiss. 1898^{28}:14, 1898.
Aecidium galii ambiguum Alb. & Schw. Consp. Fung. 116, 1805.
Puccinia difformis Kunze, Myc. Hefte 1:71, 1817.
Allodus ambigua (Alb. & Schw.) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:473, 1921.

On RUBIACEAE: 0, I, III. Autoecious.

Galium aparine L. Bingen, May 21, 1900, W. N. Suksdorf 591, Arth. Herb., Wash. Ured. 706; Pullman, July 18, 1915, F. D. Heald & C. Sax, Herb. W.S.C. 151, Wash. Ured. 2726.

As indicated above this species has no uredinia, which fact distinguishes ti from *P. punctata* (cf. 150) which occurs on the same host in Washington.

57. Puccinia bullata (Pers.) Schroet.

Beitr. Biol. Pfl. 3:74, 1879. Not *P. bullata* Link 1815, nor *P. bullata* Schw., 1822.
Uredo bullata Pers. Ann. Bot. Usteri 15:37, 1795.
Uredo angelicae Schum. Enum. Pl. Saell. 2:233, 1803.
Puccinia archangelicae A. Blytt, For. Vid.-Selsk. Christ. 6:51, 1896.
Puccinia angelicae Fuckel, Jahrb. Nass. Ver. Nat. 23-24:52, 1870.
Bullaria bullata (Pers.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:490, 1922.

On UMBELLIFERAE: 0, II, III.

Angelica genuflexa Nutt. Falcon Valley, Aug. 2, 1883, W. N. Suksdorf 24, Wash. Ured. 1323; Eatonville, Aug. 28, 1901, E. W. D. Holway, Arth. Herb.

Angelica sp. Silverton, July 8, 1920, C. R. Stillinger 725, Wash. Ured. 830.

This species is rare in Washington. It is distinguished from *P. ellisii*, another brachy-form found on the same host, by the fact that the teliospores are smooth while in the latter they are closely and finely verrucose.

58. Puccinia anomala Rostr.

Thüm. Flora 61:92, 1878.
Puccinia straminis simplex Körn. Land. Forstw. Zeit. No. 50, 1865.
Puccinia hordei Otth., Mitt. Nat. Ges. Bern 1870:114, 1871. Not *P. hordei* Fuckel, 1860.
Puccinia simplex Erikss. & Henn. Zeits. Pflanzenkr. 4:260, 1894. Not *P. simplex* Peck, 1881.
Dicaeoma anamalum (Rostr.) Arth. & From., N. Am. Flora 7:339, 1920.

On POACEAE: II, III. Hetereocious. (0, I probably on the Liliaceae).

Hordeum vulgare L. Puyallup, July 18, 1918, A. Frank, Wash. Ured. 446; Coupeville, July 18, 1919, G. L. Zundel, Wash. Ured. 138; Winslow, July 25, 1920, Wash. Ured. 168.

This is the leaf rust of barley. In 1914 Tranzschel, working in Russia, succeeded in obtaining the aecial stage of this rust on *Ornithogalum umbellatum*, the Star-of-Bethlehem. In 1922 Mains and Jackson, using telial material collected in the state of Washington, confirmed this result (Phytopath. 18: 49-60, 1923, and Jour. Agri. Res.

28:1124-1125, 1924). The rust is probably more common in the state than the above collections would indicate.

59. Puccinia antirrhini Diet. & Holw.

Hedwigia 36:298, 1897; N. Am. Flora 7:594, 1922.
Puccinia adenostegiae Arth. Bull. Torrey Club 29:231, 1902.
Dicaeoma antirrhini H. S. Jackson, Proc. Ind. Acad. Sci., *1915*:443, 1916.
Puccinia cordylanthi Blasdale, Univ. Calif. Publ. Bot. 7:134, 1918.

On Scrophulariaceae: II, III. Heteroecious. (0, I uncertain).

Antirrhinum majus L. Walla Walla, June 23, 1921, B. F. Dana, Herb. W.S.C. 803, Wash. Ured. 2785; Langley, Aug., 1921, J. M. Grant, Wash. Ured. 298; Lacey, July 15, 1922, R. Lungreen, Wash. Ured. 1173; Yelm, July 15, 1922, R. Lungreen, Wash. Ured. 1172; Vancouver, Aug. 4, 1922, Wash. Ured. 1108; Bothell, Aug. 10, 1922, Wash. Ured. 1822; Seattle, Nov. 18, 1922, Wash. Ured. 1118; also Sept. 5, 1923, Wash. Ured. 1821; Pomeroy, Sept. 15, 1824, M. A. Thompson, Wash. Ured. 1341.

This is the snap-dragon rust. It probably originated in California from some native species. The fact that the mycelium from the basiospore does not infect snap-dragons indicates that it is a heteroecious rust. It is quite generally distributed throughout the state of Washington, both in gardens and greenhouses where snap-dragons are grown.

60. Puccinia apocrypta Ellis & Tracy

Jour. Myc. 6:76, 1890.
Aecidium hydrophylli Peck, Bull. Buffalo Soc. Nat. Sci. 1:68, 1873 (Not *Dicaeoma hydrophylli* Kuntze, 1898).
Dicaeoma apocryptum (Ellis & Tracy) Kuntze, Rev. Gen. 3³:467, 1898; N. Am. Flora 7:332, 1920.

On Hydrophyllaceae: 0, I Heteroecious. (II, III on Poaceae).

Hydrophyllum albifrons Heller. Wawawai, June 9, 1894, C. V. Piper, Herb. W.S.C.; Pullman, May 20, 1916, B. F. Dana, Herb. W. S.C. 268, Wash. Ured. 2744.

Hydrophyllum capitatum Dougl. Falcon Valley, June 1, 1883, W. N. Suksdorf 379, Wash. Ured. 515; Bingen, May 11, 1894, W. N. Suksdorf 379, Wash. Ured. 628; Pullman, May 25, 1894, C. V. Piper, Wash. Ured. 2894; Wawawai, June 9, 1894, C. V. Piper, Herb. W.S. C.; also Apr. 27, 1913, J. G. Hall, Arth. Herb.; Waitsburg, Apr. 4, 1900, R. M. Horner 1421, Herb. W.S.C.; Snake River, Whitman Co., Apr. 21, 1916, B. F. Dana, Herb. W.S.C. 247, Wash. Ured. 2740; Pullman, May 3, 1916, B. F. Dana, Herb. W.S.C. 251, Wash. Ured. 2741; Locke, June 7, 1916, W. E. Flowers 6158, Wash. Ured. 2561;

Colfax, May 1, 1922, C. S. Parker, Herb. W.S.C. 994, Wash. Ured. 2809.

Hydrophyllum tenuipes Heller. Bingen, May 29, 1886, W. N. Suksdorf 340, Wash. Ured. 613; Lower Cascades, Skamania Co, May 29, 1886, W. N. Suksdorf; Renton, Apr. 17, 1910, T. C. Frye, Wash. Ured. 70; Fort Lawton, May 24, 1921, Wash. Ured. 198; Auburn, May 25, 1924, M. C. McConihe, Wash. Ured. 1334.

Hydrophyllum sp. Pullman, July 2, 1915, F. D. Heald & D. C. George, Herb. W.S.C. 71, Wash. Ured. 2712.

Nemophila parviflora Dougl. White Salmon River, Klickitat Co, May 2, 1896, W. N. Suksdorf 378, Wash. Ured. 627.

Phacelia circinata Jacq. Little White Salmon, June 26, 1895, W. N. Suksdorf 458, Wash. Ured. 671; Bingen, Mar. 29, 1902, W. N. Suksdorf 1053, Wash. Ured. 753.

On POACEAE: II, III.

Elymus glaucus Buckl. Bingen, June 28, 1900, W. N. Suksdorf 602, Arth. Herb., Wash. Ured. 715.

61. Puccinia areolata Diet. & Holw.

Bot. Gaz. 19:304, 1894.
Dicaeoma areolatum (Diet. & Holw.) Kuntze, Rev. Gen. 3³:467, 1898; N. Am. Flora 7:390, 1920.

On RANUNCULACEAE: 0, I, II, III. Autoecious.

Caltha biflora DC. Chiquash Mt. (type locality), Aug. 12, 1886, W. N. Suksdorf 318, N. Am. Ured. 1523, Arth. Herb., Wash. Ured. 594; Olympic Mts., Aug., 1895, C. V. Piper 461, Wash. Ured. 2916; Bingen, July 10, 1899, W. N. Suksdorf 1100, Wash. Ured. 1320; Granite, July 11, 1920, W. E. Morgan, Arth. Herb.

62. Puccinia arnicalis Peck

Bot. Gaz. 6:227, 1881; N. Am. Flora 7:603, 1922.

On COMPOSITAE: II, III. (0, I unknown).

Arnica fulgens Pursh. Kamiak Butte, May 24, 1921, C. S. Parker, Herb. W.S.C. 924.

This rust has been reported only from the Rocky Mountain and Pacific Coast regions. The teliospores are not thickened at the apex and are finely verrucose. The aecia of *Uromyces junci* may occur on the same host.

63. Puccinia asarina Kunze

Myk. Hefte 1:70, 1817.
Puccinia asari Link, in Willd. Sp. Pl. 6²:68, 1825.
Micropuccinia asarina (Kunze) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:525, 1922.

On Aristolochiaceae: 0, III.

Asarum caudatum Lindl. Little White Salmon, W. N. Suksdorf 386, N. Am. Ured. 525, Wash. Ured. 636; Chenowith, Aug. 12, 1896, W. N. Suksdorf 368b, Wash. Ured. 635; Locke, Aug. 1, 1915, W. E. Flowers 6137, Wash. Ured. 1227; Seattle, July 15, 1919, Wash. Ured. 992.

64. Puccinia asparagi DC.

Fl. Fr. 2:595, 1805.
Dicaeoma asparagi (DC) Kuntze, Rev. Gen. 3³:467, 1898; N. Am. Flora 7:376, 1920.

On Liliaceae: 0, I, II, III. Autoecious.

Asparagus officinalis L. Clarkston, June 6, 1915, B. F. Dana, Herb. W.S.C. 88, Wash. Ured. 2716; Pullman, July 21, 1920, G. L. Zundel, Wash. Ured. 167.

This is the asparagus rust which often produces serious damage.

65. Puccinia asperifolii (Pers.) Wettst.

Verh. Zool.-Bot. Ges. Wien 35:541, 1886.
Aecidium asperifolii Pers. Obs. Myc. 1:97, 1796.
Puccinia rubigo-vera Wint. in Rab. Krypt. Fl. 1¹:217, 1881.
Puccinia dispersa Eriks. Zeits. Pflanzenkr. 4:257, 1894.
Dicaeoma asperifolii (Pers.) Kunze, Rev. Gen. 3³:466, 1898; N. Am. Flora 7:331, 1920.
Puccinia secalina Grove, Brit. Rust. Fungi 261, 1913.

On Poaceae: II, III. (0, I probably on Boraginaceae).

Secale cereale L. Bingen, June 24, 1896, W. N. Suksdorf 553, Wash. Ured. 681; Bremerton, July 25, 1912, E. Bartholomew, Barth. N. Am. Ured. 1220, Arth. Herb.; Pullman, Aug. 30, 1916, F. D. Heald & D. C. George, Herb. W.S.C. 416, Wash. Ured 1298.

This is the leaf rust of rye and is evidently more widely distributed throughout the state than the above collections would indicate. It has usually gone under the name of *P. rubigo-vera* (DC.) Wint., which is applied to most sub-epidermal grass rusts not having strongly marked morphological characters.

The teliospores of this rust, collected from the state of Washington, have been shown by Mains and Jackson to form aecia on *Anchusa officinalis* (Phytopath. 13:49-50, 1923, and Jour. Agri. Res. 28:1119-1124, 1924).

66. Puccinia asperior Ellis & Ev.

Bull. Washburn Lab. Nat. Hist. 1:3, 1884.
Puccinia oregonensis Earle, Bull. N. Y. Bot. Gard. 2:349, 1902.
Allodus oregonensis Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Allodus asperior (Ellis & Ev.) Orton, Mem. N. Y. Bot. Gard. 6:193, 1916; N. Am. Flora 7:462, 1921.

On UMBELLIFERAE: 0, I, III. Autoecious.

Leptotaenia dissecta Nutt. Bingen (type locality), June, 1883, W. N. Suksdorf 86, Barth. N. Am. Ured. 1219, Wash. Ured. 522.

67. Puccinia asteris Duby

Bot. Gall. 2:888, 1830.
Puccinia magnoecia Ellis & Ev. Bull. Torrey Club 22:59, 1895.
Micropuccinia asteris (Duby) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:575, 1922.

On COMPOSITAE: 0, III.

Aster conspicuus Lindl. Hillyard, Sept. 20, 1914, W. E. Flowers 6006, Wash. Ured. 2505.

Aster foliaceus frondeus Gray. Lake Chelan, Aug., 1892, E. R. Lake and W. R. Hull 187, Arth. Herb.

Aster fremontii (T. & G.) Gray. Pullman, June 29, 1898, C. V. Piper 385, Arth. Herb.

Aster laevis geyeri Gray. Spokane, Oct. 1, 1893, A. M. Johnson 1169, Arth. Herb.; Hillyard, July 20, 1914, W. E. Flowers 6007, Wash. Ured. 2506.

Aster sp. Chelan, Aug., 1916, J. R. Weir 11222, Arth. Herb.

68. Puccinia asterum (Schw.) Kern

Mycologia 9:224, 1917.
Aecidium asterum Schw. Schrift. Nat. Ges. Leipzig 1:67, 1822.
Aecidium solidaginis Schw. Schrift Nat. Ges. Leipzig 1:68, 1822.
Puccinia extensicola Plowr. Brit. Ured. Ustil. 181, 1889.
Puccinia caricis-erigerontis Arth. Jour. Myc. 8:53, 1902.
Puccinia caricis-asteris Arth. Jour. Myc. 8:54, 1902.
Puccinia caricis-solidaginis Arth. Bot. Gaz. 35:21, 1903.
Dicaeoma astrum (Schw.) Arth. & Kern, N. Am. Flora 7:362, 1920.

On COMPOSITAE: 0, I. Heteroecious.

Aster occidentalis intermedius Gray. Falcon Valley, May 19, 1884, W. N. Suksdorf 164, Wash. Ured. 534.

Aster punicens L. Spokane, July 14, 1914, W. E. Flowers 6005, Wash. Ured. 2504.

Aster sp. Lake Chelan, Sept., 1916, J. R. Weir 11235, Arth. Herb.

Eucephalus ledophyllus (Gray) Greene. Chiquash Mt., Sept. 10, 1902, W. N. Suksdorf 800, Arth. Herb., Wash. Ured. 730.

On CYPERACEAE: II, III.

Carex bolanderi Olney. Seattle, June, 1892, C. V. Piper 78, Arth. Herb.; Cedar River, April 8, 1894, A. M. Parker, Wash. Ured. 64; Renton, Aug. 8, 1894, C. V. Piper 299, Wash. Ured. 1230.

Carex laeviculmis Meinsch. Bremerton, Aug., 1912, E. Bartholomew, Barth. N. Am. Ured. 827, Arth. Herb.

Carex leptopoda Mackenzie. Renton, Aug. 8, 1894, C. V. Piper 299, Arth. Herb.; Winslow, June 12, 1922, Wash. Ured. 1001; Seattle, Oct., 1922, A. J. Seltzer.

Carex multimoda Bailey. Hillyard, Sept. 20, 1914, W. E. Flowers 6331, Wash. Ured. 2595.

Carex stipata Muhl. Chehalis, July 3, 1922, Wash. Ured. 1003.

Carex tenella Schkuhr. Duckabush River, Aug. 9, 1912, E. Bartholomew, Barth. Fungi Columb. 4455, Barth. N. Am. Ured. 1226, Arth. Herb.

"This species is separable from all other American species of *Puccinia* on *Carex* by the presence of two pores in the upper part of the rather small (12-19 by 16-23 μ) urediniospores and the medium-sized (12-20 by 35-50 μ) teliospores.

"The aecia of this species should not be confused with those of *P. stipae* which occur on the same generic hosts and other Compositae in the West. In *P. asterum* the aecia are cupulate, the peridium conspicuous, the spores globoid, nearly colorless and small (11-15 by 13-18 μ). In *P. stipae* the aecia occur on hypertrophied areas, the individual cups are gall-like and open by a central aperture, the peridium is evanescent, the spores are cinnamon brown, globoid, large (21-26 by 22-29 μ)." Jackson.

69. Puccinia atrofusca (Dud. & Thomp.) Holway

Jour. Myc. 10:228, 1904.
Dicaeoma atrofuscum (Dud. & Thomp.) Arth. Result. Sci. Congr. Bot. Vienne 343, 1906; N. Am. Flora 7:353, 1920.

On Cyperaceae: II, III. (0, I unknown).

Carex douglasii Boott. Pullman, July 22, 1899, R. M. Horner 1298, Herb. W.S.C.; Hanford, June 2, 1919, C. R. Stillinger, Arth. Herb.; Spokane, May 18, 1922, W. E. Flowers 6348, Wash. Ured. 1247.

"This species possesses amphispores which were first mistaken for the teliospores of a *Uromyces*. It may be distinguished from other *Carex* rusts by the presence of the amphispores together with the normal urediniospores, the latter are 20-26 μ long and thin walled, 1.5-2 μ thick. The aecial connection is unknown. It is known only from the Rocky mountains and Pacific coast regions." Jackson.

70. Puccinia balsamorhizae Peck

Bull. Torrey Club 11:49, 1884.
Trichobasis balsamorhizae Pk. Bot. Gaz. 6:276, 1881.
Bullaria balsamorhizae (Peck) Arth. & Mains, N. Am. Flora 7:506, 1922.

On COMPOSITAE: 0, II, III. Autoecious.

Balsamorrhiza deltoidea Nutt. Falcon Valley, Aug. 3, 1884, W. N. Suksdorf 178, Arth. Herb., Wash. Ured. 545.

Balsamorrhiza sagittata (Pursh) Nutt. Pullman, Oct., 1893, C. V. Piper, Ellis & Ev. Fungi Columb. 1380, Arth. Herb.; also July 10, 1919, G. L. Zundel, Wash. Ured. 137; Wenatchee, July 15, 1912, E. Bartholomew, Barth. Fungi Columb. 4454, Barth. N. Am. Ured. 927; Spokane, Aug. 10, 1913, W. E. Flowers 6089, Wash. Ured. 2544; Pullman, July 20, 1915, D. C. George, Herb. W.S.C. 117, Wash. Ured. 2719; Locke, Aug. 20, 1917, W. E. Flowers 6093, Wash. Ured. 2546.

Balsamorrhiza sp. Pullman, July 14, 1916, B. F. Dana, Herb. W.S.C. 365.

71. Puccinia bistortae (Strauss) DC.

Fl. Fr. 6:61, 1815.
Uredo polygoni bistortae Strauss, Ann. Wett. Ges. 2:103, 1810.
Dicaeoma bistortae (DC.) Kuntze, Rev. Gen. 3³:468, 1898; N. Am. Flora 7:383, 1920.

On POLYGONACEAE: II, III. Heteroecious. (0, I on Umbelliferae).

Polygonum bistortoides Pursh. Falcon Valley, June 26, 1886, W. N. Suksdorf 247, Wash. Ured. 572; also June 24, 1893, W. N. Suksdorf, Barth. N. Am. Ured. 224, Arth. Herb.

Polygonum newberryi Small. Skamania Co., Aug. 10, 1886, W. N. Suksdorf 317, Barth. N. Am. Ured. 532, Wash. Ured 593; Chelan, Aug., 1916, J. R. Weir, Arth. Herb.

This rust has been reported only from Washington and Oregon. It is distinguished from other rusts on Polygonum by "the medium-sized teliospores (16-21 by 26-35 μ) with walls of uniform thickness, without hyaline umbo."

72. Puccinia calochorti Peck

Bot. Gaz. 6:228, 1881.
Puccinia anachoreta Ellis & Hark. Bull. Calif. Acad. 1:14, 1884.
Puccinia holwayi Dietel, Hedwigia 32:29, 1893.
Allodus calochorti (Peck) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:455, 1921.

On LILIACEAE: 0, I, II. Autoecious.

Calochortus elegans Pursh. Skamania Co., July 19, 1894, W. N. Suksdorf 1077; Wash. Ured. 774; Chiquash Mt., July 22, 1894, W. N. Suksdorf 1079, Wash. Ured. 776; Mt. Adams, July 22, 1902, W. N. Suksdorf 320 (III), 321 (I), Wash. Ured. 596.

Calochortus longebarbatus Wats. Falcon Valley, June 12, 1902, W. N. Suksdorf 248, N. Am. Ured. 533, Wash. Ured. 573.

73. Puccinia chelonis Diet. & Holw.

Hedwigia 36:297, 1897.
Micropuccinia chelonis (Diet. & Holw.) Arth. & Jackson, N. Am. Flora 7:564, 1922.

On Scrophulariaceae: 0, III.

Chelone nemorosa Dougl. Chiquash Mt., Aug. 27, 1895, W. N. Suksdorf 455, N. Am. Ured. 128, Wash. Ured. 668; Mt. Adams, Sept. 3, 1900, W. N. Suksdorf 596, Wash. Ured. 709; Mt. Adams, East side, Aug. 25, 1907, W. N. Suksdorf 1058, Wash. Ured. 757.

This rust is reported on the same host in Oregon.

74. Puccinia cicutae Lasch

Herb. Viv. Myc. 787, 1845.
Dicaeoma cicutae (Lasch) Kuntze, Rev. Gen. 3³:468, 1898; N. Am. Flora 7:398, 1920.

On Umbelliferae: 0, I, II, III. Autoecious.

Cicuta occidentalis Greene. Wapato, Sept. 13, 1921, G. L. Zundel, Wash. Ured. 1136.

75. Puccinia circaeae Pers.

Neues Mag. Bot. 1:119, 1794.
Micropuccinia circaeae (Pers.) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:548, 1922.

On Onagraceae: 0, III.

Circaea alpina L. Locke, Aug. 25, 1915, W. E. Flowers 6141, Wash. Ured. 1151.

Circaea pacifica Asch. & Magn. Falcon Valley, Aug. 2, 1884, W. N. Suksdorf 177, Wash. Ured. 544; Renton, July 14, 1892, C. V. Piper 113, Arth. Herb., Wash. Ured. 2882; Cedar River, Aug. 8, 1894, A. Parker, Wash. Ured. 65; Blue Mt., Columbia Co., June 23, 1897, R. M. Horner 1205, Herb. W.S.C.; Bremerton, July 22, 1912, E. Bartholomew, Fungi Columb. 4456, Herb. W.S.C.; Newport, July, 1915, J. R. Weir 45, Arth. Herb.; Puyallup, July 31, 1918, A. Frank, Wash. Ured. 417; Friday Harbor, July, 1919, G. Howard, Wash. Ured. 290; Silverton, July 7, 1920, C. R. Stillinger 750, Wash. Ured. 1081; Kirkland, July 10, 1920, C. R. Stillinger & G. B. Posey 701, Wash. Ured. 810; Randle, Aug. 3, 1920, J. S. Boyce, Wash. Ured. 2856.

76. Puccinia cirsii Lasch

Rab. Fungi Eur. 89, 1859.
Puccinia californica Dietel, Bot. Gaz. 18:254, 1893.
Puccinia laschii Lagerh. Tromsö Mus. Aarsh. 17:63, 1895.
Puccinia inclusa Sydow, Monog. Ured. 1:56, 1902.
Bullaria cirsii (Lasch) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:509, 1922.

On Compositae: 0, II, III. Autoecious.

Cirsium breweri (Gray) Jepson. Pullman, Aug. 31, 1894, C. V. Piper 506, Wash. Ured. 2909.

Cirsium edule Nutt. Renton, July 14, 1892, C. V. Piper, Arth. Herb.; Seattle, Aug., 1892, C. V. Piper 46, Herb. W.S.C., Wash. Ured. 1306.

Cirsium lanceolatum (L.) Scop. Spokane, July 4, 1914, W. E. Flowers 6030, Wash. Ured. 2528.

Cirsium polousense Piper. Pullman, Sept. 4, 1920, G. L. Zundel, Wash. Ured. 1274.

Cirsium remotifolium (Hook.) DC. Skamania Co., Apr. 25, 1880 and Oct. 2, 1894, W. N. Suksdorf 316, Wash. Ured. 592.

Cirsium undulatus (Nutt.) Spreng. Spokane, Aug. 28, 1898, C. V. Piper 547, Wash. Ured. 2830.

77. Puccinia claytoniata (Schw.) Peck

Bull. N. Y. State Mus. 6:226, 1899.
Caeoma (*Aecidium*) *claytoniata* Schw. Trans. Am. Phil. Soc. II, 4:294, 1832.
Puccinia mariae-wilsoni G. W. Clinton, Bull. Buff. Soc. Nat. Hist. 1:66, 1873.
Allodus claytoniata (Schw.) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:457, 1921.

On Portulacaceae: 0, I, III. Autoecious.

Claytonia asarifolia Bong. Mt. Adams, Aug. 19, 1886, W. N. Suksdorf 322, Barth. N. Am. Ured. 133, Wash. Ured. 597; Chiquash Mts., Aug. 10, 1886, W. N. Suksdorf 273, Arth. Herb.; Skamania Co., Aug. 10, 1886, W. N. Suksdorf 131, Holway Herb.

78. Puccinia clematidis (DC.) Lagerh.

Tromsö Mus. Aarsh. 17:54, 1895.
Aecidium clematitis DC. Fl. Fr. 2:243, 1805.
Aecidium aquilegiae Pers. Ic. Pict. 58, 1806.
Puccinia elymi Westend, Bull. Acad. Brux. 18²:408, 1851.
Puccinia tomipara Trel. Trans. Wis. Acad. Sci. 6:127, 1885.
Puccinia perplexans Plowr. Quart. Jour. Micr. Sci. 25:164, 1885.
Puccinia persistens Plowr. Brit. Ured. 180, 1889.
Puccinia agrostidis Plowr. Gard. Chron. III, 8:139, 1890.
Puccinia agropyri Ellis & Ev. Jour. Myc. 7:131, 1892.
Puccinia aquilegiae Lagerh. Tromsö Mus. Aarsh. 17:47, 1895.
Puccinia adspersa Dietel & Holway, Erythea 3:81, 1895.
Puccinia triticina Eriksson, Ann. Sci. VIII, 9:270, 1899.
Aecidium delphinii Barth. Jour. Myc. 8:173, 1902.
Puccinia cinerea Arth. Bull. Torrey Club 34:583, 1907.
Puccinia missouriensis Arth. Bull. Torrey Club 45:146, in part, 1918.
Dicaeoma clematidis (DC.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:333, 1920.

On Ranunculaceae: 0, I. Hetereocius.

Actaea spicata arguta (Nutt.) Torr. Prindle, May 26, 1824, W. N. Suksdorf 1102, Wash. Ured. 1340.

Anemone piperi Britton. Spokane, July, 1914, J. R. Weir 83, Arth. Herb.

Aquilegia formosa Fisch. Skamania Co., Aug. 12, 1886, W. N. Suksdorf 290, Arth. Herb., Wash Ured. 586; Silverton, July 8, 1920, C. R. Stillinger & G. B. Posey 716, Wash. Ured. 822.

Clematis hirsutissima Pursh. Pullman, June 2, 1894, C. V. Piper 321, Wash. Ured. 2896; Spokane, July 10, 1914, W. E. Flowers 6015, Wash. Ured. 2514.

Clematis ligusticifolia Nutt. Spangle, June 17, 1889, W. N. Suksdorf 360, Wash. Ured. 622; Whitman Co., 1892, E. R. Lake & W. R. Hull 215, Arth. Herb.; Spokane, July 11, 1910, W. E. Flowers 6012, Wash. Ured. 2511; Wenatchee, July 15, 1912, E. Bartholomew, Arth. Herb., Barth. Fungi Columb. 4457; Yakima, July 5, 1915, Wash. Ured. 126; Waitsburg, July 20, 1919, Wash. Ured. 223; Wawawai, May 15, 1921, C. S. Parker, Herb. W.S.C. 922, Wash. Ured. 2801.

Clematis sp. Pullman, June 15, 1915, H. M. Woolman, Herb. W.S.C. 37, Wash. Ured. 2707.

Delphinium menziesii DC. Spokane, May 8, 1914, W. E. Flowers 6291, Wash. Ured. 2582.

Ranunculus glaberrimus Hook. Pullman, May 7, 1894, C. V. Piper 257, Wash. Ured. 2892; Spokane, Mar. 24, 1914, W. E. Flowers 6238, Wash. Ured. 2578; Spangle, Apr. 24, 1916, W. N. Suksdorf 1063, Wash. Ured. 761; Colfax, May 1, 1922, C. S. Parker, Herb. W.S.C. 992, Wash. Ured. 2808.

Ranunculus hebecarpus H. & A. Bingen, Dec. 28, 1893, W. N. Suksdorf 258, Wash. Ured. 580.

Ranunculus occidentalis Nutt. Bingen, May 14, 1897, W. N. Suksdorf 457, Wash. Ured. 670.

Thalictrum occidentale Gray. Pullman, June 20, 1893, C. V. Piper, Rocky Mt. Herb. 5707, Arth. Herb.; Locke, July 20, 1915, W. E. Flowers 6027, Wash. Ured. 2525; Chesaw, July 7, 1921, C. S. Parker, Herb. W.S.C. 868, Wash. Ured. 2793; Sol Duc Hot Springs, July 14, 1920, J. S. Boyce 628, Wash. Ured. 2855; Twisp Pass, July 20, 1921, C. S. Parker, Herb. W.S.C. 918, Wash. Ured. 2799.

On Poaceae: II, III.

Agropyron repens (L.) Beauv. Vancouver, Sept. 25, 1912, E. Bartholomew, Barth. N. Am. Ured. 1144, Arth. Herb.; Coupeville, Aug. 26, 1918, Wash. Ured. 128; Seattle, Sept. 8, 1918, Wash. Ured.

341; Granite Falls, Sept. 16, 1921, G. L. Zundel, Wash. Ured. 1157; Kirkland, Nov. 12, 1921, Wash. Ured. 248; Bothell, Nov. 12, 1921, Wash. Ured. 249; Medina, Nov. 2, 1921, Wash. Ured. 265.

Agropyron riparium Scribn. & Smith. Kirkland, Nov. 12, 1921, Wash. Ured. 246.

Agropyron spicatum (Pursh) S. & S. Bingen, June 28, 1900, W. N. Suksdorf 60, Wash. Ured. 718; Yakima, July 18, 1919, F. D. Heald, Herb. W.S.C. 624.

Agropyron sp. Bingen, May 27, 1896, W. N. Suksdorf 531, Wash. Ured. 680.

Bromus carinatus Hook. & Arn. Bingen, Aug. 27, 1900, W. N. Suksdorf 587, Wash. Ured. 702; Kent, Aug. 20, 1912, E. Bartholomew, N. Am. Ured. 1128, Arth. Herb.; Puyallup, Oct. 6, 1918, A. Frank, Wash. Ured. 422; Hoquiam, July 2, 1920, C. R. Stillinger, Arth. Herb.; Olympia, July 28, 1920, C. R. Stillinger, Arth. Herb.; Rolling Bay, Oct. 9, 1921, Wash. Ured. 204; Winslow, Oct. 9, 1921, Wash. Ured. 208; Georgetown, Nov. 10, 1921, Wash. Ured. 227; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 284.

Bromus marginatus Nees. Puyallup, Aug. 29, 1919, A. Frank, Wash. Ured. 426; Seattle, May 13, 1920, W. E. Flowers 6330, Wash. Ured. 2594.

Bromus polyanthus Schribn. Puyallup, Aug. 23, 1909, E. Bartholomew, Barth. Fungi Columb. 3165, Arth. Herb.

Bromus sitchensis Bong. Kent, Aug. 20, 1912, E. Bartholomew, Barth. N. Am. Ured. 1330, Fungi Columb. 445, Arth. Herb.

Bromus subvelutinus Shear. Bremerton, July 31, 1912, E. Bartholomew 4800, Arth. Herb.

Bromus sp. Falcon Valley, July 26, 1886, W. N. Suksdorf 33, Wash. Ured. 506; Bingen, May 25, 1902, W. N. Suksdorf 794, Wash. Ured. 726; Georgetown, Nov. 10, 1921, Wash. Ured. 227.

Elymus arenarius L. Rolling Bay, Oct. 9, 1921, Wash. Ured. 206; Winslow, Oct. 10, 1921, Wash. Ured. 205; Bothell, Nov. 12, 1921, Wash. Ured. 261; Aberdeen, Sept. 6, 1922, Wash. Ured. 1039.

Elymus condensatus Presl. Wenatchee, July 15, 1912, E. Bartholomew, Barth. Fungi Columb. 4458, N. Am. Ured. 1341, Arth. Herb.; Yakima, July 7, 1915, F. D. Heald, Herb. W.S.C. 140, Wash. Ured. 2742; Pullman, Sept. 6, 1916, D. C. George, Herb. W.S.C. 426, Wash. Ured. 1297; Kennewick, June 2, 1919, C. R. Stillinger, Wash. Ured. 2724; Colton, Aug. 20, 1919, Wash. Ured. 342; Waitsburg, Aug., 1919, Wash. Ured. 343.

Elymus glaucus Buckl. Skamania Co., Sept. 13, 1902, W. N.

Suksdorf 793, Wash. Ured. 725; near Trout Lake, Klickitat Co., Sept. 13, 1902, W. N. Suksdorf 792, Arth. Herb.; Falcon Valley, July 17, 1905, W. N. Suksdorf 994, Wash. Ured. 752; Hillyard, Sept. 20, 1914, W. E. Flowers 6002, Wash. Ured. 2501; Langley, Sept., 1921, J. M. Grant, Wash. Ured. 303; Markham, Sept. 6, 1922, Wash. Ured. 1038.

Elymus voncouverensis Vasey. Tacoma, June 25, 1920, C. R. Stillinger 1044, Arth. Herb.

Hordeum nodosum L. Hoquiam, Oct., 1922, E. Bethel.

Puccinia clematidis as here used is in accordance with the arrangement which Arthur and Fromme have made in the North American Flora 7:333, 1920. This species shows a number of quite sharply differentiated races, each of which acts quite differently toward the hosts of the others, showing biologic differences; but as far as at present known, there is little or no morphological difference. Unless further cultural data show that distinct morphological differences are connected with these biological differences it is well to consider the different forms as races rather than as independent species. Some authors prefer to take the latter view, designating the rust found on *Agropyron* as *P. agropyri* Ellis & Ev., that on *Bromus* as *P. tomipara* Trel., *P. alternans* Arth. or *P. bromina* Eriks.; that on *Elymus* as *P. elymi* Lagerh.; that on *Poa* as *P. cinerea* Arth., et al. The common leaf rust of wheat (*P. triticina* Eriks.) is cited above as a synonym and probably is, but it would seem to serve the purposes of this paper best to list the collections on wheat separately (Cf. 167).

79. Puccinia clintonii Peck

Ann. Rept. N. Y. State Mus. 28:61, 1876.
Micropuccinia clintonii (Peck) Arth. & Jackson; N. Am. Flora 7:564, 1922.

On Scrophulariaceae: 0, III.

Pedicularis groenlandica Retz. Locke, July 19, 1917, W. E. Flowers 6022, Wash. Ured. 2520.

80. Puccinia cnici Mart.

Fl. Mosq. 226, 1817.
Puccinia cirsii-lanceolati Schroet., Cohn, Krypt. Fl. Schl. 3[1]:317, 1887.
Dicaeoma cnici (H. Mart.) Arth. Résult Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:435, 1921.

On Compositae: 0, I, II, III. Autoecious.

Cirsium lanceolatum (L.) Hill. Bingen, May 22, 1894, W. N. Suksdorf 390, Wash. Ured. 641; Bainbridge Is., July 17, 1909, E. Bartholomew, Barth. Fungi Columb. 3169, Arth. Herb.; Seattle, Apr. 8, 1910, T. C. Frye, Arth. Herb., Wash. Ured. 68; Manette, July 20,

1912, E. Bartholomew 4751, Barth. N. Am. Ured. 832, Arth. Herb.; Bremerton, E. Bartholomew, Barth. N. Am. Ured. 831, Arth. Herb.; Pullman, July 20, 1915, D. C. George, Herb. W.S.C. 119, Wash. Ured. 2720; Yakima, Sept. 10, 1915, Wash. Ured. 40; Seattle, Oct. 4, 1917, Wash. Ured. 81; Winslow, May, 1920, Wash. Ured. 159; Kirkland, July 10, 1920, C. R. Stillinger 704, Wash. Ured. 812; Fir, Aug. 17, 1920, F. Renner, Arth. Herb.; Monroe, Sept. 17, 1921, G. L. Zundel, Wash. Ured. 1138; Renton, Oct. 3, 1921, Wash. Ured. 1070; Bothell, Nov. 12, 1921, Wash. Ured. 247; Medina, Nov. 12, 1921, Wash. Ured. 239; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 283; Forks, June 28, 1922, Wash. Ured. 987; Olympia, July 21, 1922, Wash. Ured. 1270; Puget, July 21, 1922, Wash. Ured. 994; Boston Harbor, July 21, 1922, Wash. Ured. 995; Langley, Feb. 10, 1923, J. M. Grant, Wash. Ured. 1813; Edmonds, Apr. 15, 1923, A. J. Seltzer, Wash. Ured. 1800; Gig Harbor, June 9, 1923, A. J. Seltzer, Wash. Ured. 1811.

81. Puccinia columbiensis Ell. & Ev.

Proc. Acad. Sci. Phila. 1893:153, 1893.
Puccinia bicolor Ell. & Ev. Bull. Torrey Club 27:572, 1900.
Puccinia nabali Arth. Bull. Torrey Club 37:571, 1910.
Micropuccinia columbiensis (Ellis & Ev.) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:585, 1922.

On COMPOSITAE: 0(?), III.

Hieracium scouleri Hook. Waitsburg, May 7, 1900, R. M. Horner, E. & E. Fungi Columb. 1570, Arth. Herb. (type collection).

Hieracium sp. Chiquash Mt., July 19, 1894, W. N. Suksdorf 384, Arth. Herb., Wash. Ured. 633.

82. Puccinia comandrae Peck

Bull. Torrey Club 11:49, 1884.
Micropuccinia comandrae (Peck) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:553, 1922.

On SANTALACEAE: 0, III.

Comandra pallida DC. Columbus, June 10, 1886, W. N. Suksdorf 341; Locke, July 19, 1912, W. E. Flowers 6020, Wash. Ured. 2519.

Comandra umbellata (L.) Nutt. Falcon Valley, Sept., 1894, W. N. Suksdorf 414, Wash. Ured. 663.

83. Puccinia commutata Sydow

Monog. Ured. 1:201, 1902.
Allodus commutata (Sydow) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:473, 1921.

On VALERIANACEAE: 0, I, III.

Valerianella congesta Lindl. Husum, Apr. 30, 1884, W. N. Suks-

dorf 161, Arth. Herb., Wash. Ured. 531; Bingen, May 5, 1894, W. N. Suksdorf 167, Wash. Ured. 1186.

84. Puccinia consimilis Ellis & Ev.

Jour. Myc. 6:120, 1891.
Allodus consimilis (Ellis & Ev.) Orton, Mem. N. Y. Bot. Gard. 6:187, 1916; N. Am. Flora 7:459, 1921.

On Cruciferae: 0, I, III. Autoecious

Sisymbrium linifolium Nutt. Reported for Washington by E. W. D. Holway in his N. Am. Ured. 1:44, 1906, but the writer was unable to obtain the data for this collection.

Prof. C. O. Rosendahl very kindly looked over Holway's collection but could find no specimens of this species from the state of Washington. It appears that most of the specimens of this species in the Holway herbarium were collected in Montana and Wyoming.

85. Puccinia crepidis-montanae (Syd.) Magnus

Beitr. Krypt. Schweiz. 2^2:212, 1904.
Aecidium crepidis-montanae Sydow, Oesterr. Bot. Zeits. 51:29, 1901.
Dicaeoma crepidis-montanae (Syd.) Arth., N. Am. Flora 7:439, 1921.

On Compositae: 0, I, II, III. Autoecious.

Crepis barbigera Leib. Wenatchee, July 15, 1912, E. Bartholomew, Barth. Fungi Columb. 4459, Arth. Herb.; Spokane, June 24, 1913, G. Turreson, Arth. Herb.

Crepis gracilis (Eaton) Rydb. Waitsburg, May 7, 1900, R. M. Horner 1436, Herb. W.S.C.

86. Puccinia cryptanthes Dietel & Holway

Erythea 1:249, 1893.
Dicaeoma (?) *cryptanthes* (Diet. & Holw.) Arth., N. Am. Flora 7:404, 1920.

On Boraginaceae: II, III. (0, I unknown).

Cryptantha torreyana (Gray) Greene. Falcon Valley, July 19, 1886, W. N. Suksdorf 263, Wash. Ured. 584.

87. Puccinia curtipes Howe

Bull. Torrey Club 5:3, 1874.
Puccinia striata Cooke, Grevillea 7:3, 1878.
Puccinia saxifragae curtipes Dietel, Ber. Deuts. Bot. Ges. 9:40, 1891.
Puccinia striatospora Peck, Mycologia 5:71, 1913.
Micropuccinia curtipes (Howe) Arth. & Jackson, Bull. Torrey Club 48:42, 1921; N. Am. Flora 7:536, 1922.

On Saxifragaceae: 0, III.

Heuchera glabella T. and G. Pullman, June 28, 1898, L. D. Malone; also same date, C. V. Piper 607, Herb. W.S.C., June 28, 1916, B. F. Dana, Herb. W.S.C. 310, Wash. Ured. 2748; Waitsburg, May,

1900, R. M. Horner 1431, Arth. Herb., Herb. W.S.C., E. & E. Fungi Columb. 1571.

Saxifraga oregana Howell. Falcon Valley, June 23, 1911, W. N. Suksdorf 1094, Wash. Ured. 1258.

This species should not be confused with *P. heucherae* found in Washington on the same hosts. They both belong to the micro-type. The teliospores of the rust under consideration are strongly striate and mostly ellipsoid, while in *P. heucherae* they are smooth with only occasional striae and mostly oblong in shape.

88. Puccinia cyani (Schleich.) Pass.

Rabh. Fungi Eur. 1767, 1873.
Uredo cyani Schleich. (Pl. Crypt. Helv. 95, hyponym, 1805); DC. Fl. Fr. 6:74, 1815.
Bullaria cyani (Schleich.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:511, 1922.

On COMPOSITAE: 0, II, III.

Centaurea cyanus L. Bingen, July 1, 1912, W. N. Suksdorf 1096, Wash. Ured. 1203; Pullman, July 18, 1921, C. S. Parker, W.S.C. 790, Wash. Ured. 2783; Seattle, Apr. 30, 1923, V. Stedman, Wash. Ured. 1801.

89. Puccinia dichelostemmae Diet. & Holw.

Erythea 3:78, 1895.
Allodus dichelostemmae (D. &. H.) Orton, Mem. N. Y. Bot. Gard. 6:183, 1916; N. Am. Flora 7:456, 1921.

On LILIACEAE: 0, I, III. Autoecious.

Hookera douglasii (Wats.) Piper. Pullman, May 22, 1894, C. V. Piper 256, Wash. Ured. 340; also June 11, 1915, F. D. Heald and D. C. George, Herb. W.S.C. 33, Wash. Ured. 2705.

Hookera pulchella Salisb. Bingen (type region), May 22, 1894, W. N. Suksdorf 389, Barth. N. Am. Ured. 139, Arth. Herb., Wash. Ured. 639.

"This species may be separated from all other species of *Puccinia* occurring on Liliaceae by the very large, broad teliospores (38-45 by 43-58 μ) having smooth walls 5-7 μ thick." Jackson.

90. Puccinia douglasii Ellis & Ev.

Proc. Phil. Acad. 1893:152, 1893.
Puccinia richardsonii Sydow, Monog. Ured. 1:317, 1902.
Allodus douglasii (Ellis & Ev.) Orton, Mem. N. Y. Bot. Gard. 6:198, 1916; N. Am. Flora 7:469, 1921.

On POLEMONIACEAE: 0, I, III. Autoecious.

Phlox diffusa Benth. Mt. Adams, Aug. 31, 1894, W. N. Suksdorf 376, Arth. Herb., Barth. N. Am. Ured. 154, Wash. Ured. 625.

Phlox rigida Benth. Spokane, June 9, 1919, J. R. Weir 10250, Arth. Herb.; also June 9, 1919, W. E. Flowers 6038, Wash. Ured. 1235.

91. Puccinia dracunculi (Thüm.) ~~comb. nov.~~ preoccupied

Aecidium dracunculi Thüm., Bull. Soc. Nat. Moscow, 58:212, 1878. Not *Puccinia dracunculi* Auersw. Herb. Viv. Myc. 1488, 1850.
Puccinia universalis Arth. Jour. Myc. 14:21, 1908.
Dicaeoma dracunculi (Thüm.) Arth. & Kern, N. Am. Flora 6:360, 1920.

On COMPOSITAE: 0, I, Heteroecious.

Artemisia ludoviciana Nutt. Spokane, July 4, 1914, W. E. Flowers 6029, Wash. Ured. 2527.

On CYPERACEAE: II, III.

Carex rossii Boott. Falcon Valley, Sept. 28, 1898, W. N. Suksdorf 552, Wash. Ured. 698.

92. Puccinia effusa Dietel & Holway

Erythea 3:81, 1893.
Allodus effusa (D. & H.) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:460, 1921.

On VIOLACEAE: 0, I, III. Autoecious.

Viola nuttallii praemorsa (Dougl.) Wats. Falcon Valley, Sept. 2, 1894, W. N. Suksdorf 407, Arth. Herb., Barth. N. Am. Ured. 1438, Wash. Ured. 657.

93. Puccinia ellisii De-Toni

Sacc. Syll. Fung. 7:651, 1888.
Puccinia angelicae Ellis & Ev., Bull. Washb. Lab. Nat. Hist. 1:3, 1884 (Not *P. angelicae* Fuckl. 1870).
Puccinia bakeriana Arth. Bull. Torrey Club 31:3, 1904.
Bullaria ellisii (De-Toni) Arth. & Mains, N. Am. Flora 7:491, 1922.

On UMBELLIFERAE: II, III. Autoecious.

Angelica genuflexa Nutt. Falcon Valley, Aug., 1883, W. N. Suksdorf, Ellis N. Am. Fungi 1449, Arth. Herb.

P. angelicae Fckl. also occurs on the same host as this species but the teliospores are smooth, while in *P. ellisii* they are verrucose.

94. Puccinia epilobii-tetragoni (DC.) Wint.

Rabenh. Krypt. Fl., 1:214, 1881.
Uredo vagans epilobii-tetragoni DC., Fl. Fr. 2:228, 1805.
Puccinia gayophyti Billings, in King's Geol. Expl. 40th Par. 5:414, 1871.
Puccinia oenotherae Vize, Grevillea 5:109, 1877.
Puccinia boisduvaliae Peck, Bot. Gaz. 7:45, 1882.
Puccinia clarkiae Peck, Bull. Torrey Club 11:49, 1884.
Puccinia glabella Holw. N. Am. Ured. 1:76, 1907.
Dicaeoma epilobii-tetragoni (DC.) Arth. N. Am. Flora 7:394, 1920.

On ONAGRACEAE: 0, II, III. Autoecious.

Boisduvalia densiflora (Lindl.) Wats. Pullman, Aug., 1893, C.

V. Piper 135, Wash. Ured. 2886; Spangle, June 24, 1898, C. V. Piper 393, Wash. Ured. 1331.

Clarkia pulchella Pursh. Pullman, July 28, 1894, C. V. Piper 178, Wash. Ured. 2804; Spokane, June 8, 1914, W. E. Flowers 6147, Wash. Ured. 1240.

Clarkia rhomboidea Dougl. Falcon Valley, June 23, 1893, W. N. Suksdorf 240, Arth. Herb., Wash. Ured. 566; Bingen, May 5, 1894, W. N. Suksdorf 240b, Arth. Herb., Ellis N. Am. Ured. 159; Fort Lawton, May 26, 1922, Wash. Ured. 1266.

Epilobium adenocaulon Haussk. Falcon Valley, May 19, 1884, W. N. Suksdorf 163, Arth. Herb., Wash. Ured. 533; Bingen, May 27, 1902, W. N. Suksdorf 799, Wash. Ured. 728; Parker Lake, May 23, 1915, W. E. Flowers 6310, Wash. Ured. 1243.

Epilobium alpinum L. Bingen, Sept. 15, 1898, W. N. Suksdorf 547, Wash. Ured. 693.

Epilobium americanum Haussk. Oakesdale, June 13, 1919, C. R. Stillinger, Arth. Herb.

Epilobium paniculatum Nutt. Falcon Valley, July 26, 1883, W. N. Suksdorf 25, Wash. Ured. 503; Almota, Apr. 18, 1894, C. V. Piper 2, Arth. Herb., Wash. Ured. 2891; Pullman, June 6, 1894, C. V. Piper 502, Wash. Ured. 2897; Bingen, May 10, 1895, W. N. Suksdorf 1081, Wash. Ured 778; Blue Mts., Columbia Co., July 17, 1897, R. M. Horner 1199 and 1200, Herb. W.S.C.; Bremerton, Aug. 30, 1912, E. Bartholomew, Barth. N. Am. Ured. 1148, Arth. Herb.; Kirkland, July 10, 1920, C. R. Stillinger 705, Wash. Ured. 813; Palouse, Sept. 15, 1920, G. B. Posey and C. R. Stillinger 776, Wash. Ured. 1092.

Epilobium sp. Glacier, July 8, 1920, C. R. Stillinger 642; Pullman, Aug. 23, 1921, B. F. Dana, Herb. W.S.C. 907, Wash. Ured. 2798.

Gayophytum cæsium T. & G. Falcon Valley, June 23, 1893, W. N. Suksdorf 239, Wash. Ured. 565.

Gayophytum ramosissimum T. & G. Spokane, May 19, 1913, W. E. Flowers 6126, Wash. Ured. 1237; Locke, June 21, 1915, W. E. Flowers 6281, Wash. Ured. 2579.

Gayophytum sp. Mt. Adams, Sept. 18, 1894, W. N. Suksdorf 1080, Wash. Ured. 777.

Godetia epilobioides Wats. Bingen, May 12, 1894, W. N. Suksdorf 332, Wash. Ured. 607.

Godetia sp. Bingen, June 2, 1894, W. N. Suksdorf 1074, Wash. Ured. 772.

Oenothera strigosa Rydb. Medical Lake, July 4, 1906, W. E. Flowers 6025, Wash. Ured. 2523.

Oenothera sp. Spangle, June 22, 1904, W. N. Suksdorf 977, Wash. Ured. 742; Spokane, June 8, 1910, W. E. Flowers 6182, Wash. Ured. 2574.

Sphaerostigma andinum (Nutt.) Walp. Coulee City, June 1, 1902, C. V. Piper 800, Arth. Herb.

Sphaerostigma boothii (Dougl.) Walp. Rock Island, July, 1893, Sandberg and Leiberg, Arth. Herb.

Sphaerostigma contortum (Dougl.) Walp. Yakima, May 27, 1892, C. V. Piper 807, Arth. Herb.

Sphaerostigma sp. Blue Mts., Columbia Co., July 11, 1897, R. M. Horner 1198, Herb. W.S.C.

This species includes all the long-cycled autoecious rusts found on the Onagraceae.

95. Puccinia epiphylla (L.) Wettst.

Verhl. Zool.-Bot. Ges. Wein 35:541, 1885.
Lycoperdon epiphyllum L. Sp. Pl. 1185, 1753.
Aecidium tussilaginis Pers. in Gmel. Syst. Nat. 2:1473, 1791.
Puccinia poarum Niels. Bot. Tidsskr. III. 2:34, 1877.
Dicaeoma epiphyllum (L.) Kuntze, Rev. Gen. 3³:468, 1898; N. Am. Flora 7:327, 1920.

On Poaceae: II, III. (0, I on Compositae).

Poa compressa L. Marysville, July 18, 1920, C. R. Stillinger, Arth. Herb.; Ilwaco, Oct. 16, 1922, E. Bethel, Wash. Ured. 1072.

Poa pratensis L. Bingen, May 7, 1894, W. N. Suksdorf 397, Wash. Ured. 650; Bainbridge Island, Aug. 4, 1909, E. Bartholomew, Barth. Fungi Columb. 3175, Arth. Herb.; Duckabush River, Jefferson Co., Aug. 7, 1912, E. Bartholomew, Barth. N. Am. Ured. 761, Arth. Herb.; Pullman, June 20, 1915, H. M. Woolman, Herb. W.S.C. 49, Wash. Ured. 2711; Hoquiam, July 2, 1920, C. R. Stillinger and G. B. Posey, Arth. Herb., Wash. Ured. 1097; Winslow, Nov. 2, 1921, Wash. Ured. 267; Bothell, Dec. 10, 1921, Wash. Ured. 273; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 280.

Poa trivialis L. Hoquiam, June 25, 1920, C. R. Stillinger and G. B. Posey, Arth. Herb.

Poa vaseyochloa Scribn. Bingen, May 11, 1894, W. N. Suksdorf 398, Arth. Herb., Wash. Ured. 651.

96. Puccinia expansa Link

in Willd, Sp. Pl. 6²:75, 1825.
Micropuccinia expansa (Link) Arth. & Jackson, Bull. Torrey Club 48:40, 1921; N. Am. Flora 7:583, 1922.

On Compositae: 0, III.

Senecio sp. Spokane, May 11, 1914, W. E. Flowers 6329, Wash. Ured. 1246.

97. Puccinia gemella Diet. & Holw.

Sydow Monog. Ured. 1:541, 1903.
Micropuccinia gamella (Diet. & Holw.) Arth. & Jackson, N. Am. Flora 7:529, 1922.

On Ranunculaceae: 0, III.

Caltha biflora DC. Granite, July 17, 1920, W. E. Morgan, Arth. Herb.

Caltha loptosepala DC. Mt. Rainier, Aug. 23, 1901, E. W. D. Holway (type material), Arth. Herb.

There are three rusts found on *Caltha* in Washington, *P. areolata,* a eu-type, *P. treleasiana,* a micro-type with rough teliospores, and *P. gemella,* a micro-type with smooth teliospores.

98. Puccinia gentianae (Strauss) Link

in Willd. Sp. Pl. 6²:73, 1825.
Uredo gentianae Strauss, Ann. Wett. Ges. 2:102, 1810.
Dicaeoma gentianae (Strauss) Kuntze, Rev. Gen. 3³:468, 1898; N. Am. Flora 7:400, 1920.

On Gentianaceae: 0, I, II, III.

Gentiana oregana Engelm. Pullman, Sept. 23, 1893, C. V. Piper 127, Arth. Herb., Wash. Ured. 2889.

99. Puccinia gigantea P. Karst.

Bidr. Finl. Nat. Folk 31:42, 1879.
Puccinia annulata Ellis & Ev., Bull. Torrey Club 27:60, 1900.
Micropuccinia gigantea (P. Karst.) Arth. & Jackson, N. Am. Flora 7:549, 1922.

On Onagraceae: 0, III.

Epilobium angustifolium L. Hillyard, July 20, 1914, W. E. Flowers 6499, Wash. Ured. 2602.

100. Puccinia giliae Hark.

Bull. Calif. Acad. 1:34, 1884.
Dicaeoma giliae (Hark.) Kuntze, Rev. Gen. 3³:469, 1898; N. Am. Flora 7:403, 1920.

On Polemoniaceae: II, III (0, I unknown).

Collomia grandiflora Dougl. Falcon Valley, July 10, 1900, W. N. Suksdorf 598, N. Am. Ured. 1650, Arth. Herb., Wash. Ured. 711.

This rust should not be confused with *P. plumbaria.* The latter does not have uredinia, the telia are long, covered by the cinereous epidermis and the teliospores are finely and closely verrucose. *P. Giliae* on the other hand has uredinia, the telia are early naked and the teliospores are smooth.

101. Puccinia glumarum (Schmidt) Erikss. & Henn.

Zeits. Pflanzenkr. 4:197, 1894.
Uredo glumarum Schmidt. Nat. Landw. Schädl. Pilze, 1819; Fries Om Band och Rost 23:1821; Allg. Oekon, Fl. 1:27, 1827.
Puccinia neglecta West. Bull. Soc. Bot. Belg. 2:248, 1863.
Dicaeoma glumarum (Schmidt) Arth. & From., N. Am. Flora 7:338, 1920.

On Poaceae: II, III (0, I unknown).

Aegilops cylindrica Host. Pullman, May 5, 1921, G. L. Zundel, Herb. W.S.C. 784, Wash. Ured. 2782.

Agropyron cristatum Beauv. Pullman, Aug. 29, 1916, C. W. Hungerford 15, Wash. Ured. 1347.

Agropyron sp. Pullman, July 19, 1916, B. F. Dana, Herb. W.S. C. 391, Wash. Ured. 2757.

Bromus hookerianus (Thurb.) Shear. Everett, July, 1892, C. V. Piper 206, Arth. Herb.

Bromus marginatus Nees. Pullman, July 14, 1915, H. B. Humphrey & A. G. Johnson, Arth. Herb.; also Aug. 29, 1916, C. W. Hungerford 14, Wash. Ured. 1349; Burlington, Sept. 2, 1916, C. W. Hungerford 28, Wash. Ured. 1350.

Bromus pacificus Shear. Friday Harbor, June 15, 1916, H. B. Humphrey, Arth. Herb.

Bromus sitchensis Bong. Bellingham, Sept. 1, 1916, C. W. Hungerford 26, Wash. Ured. 1351.

Bromus sp. Waitsburg, July 22, 1918, Wash. Ured. 127.

Elymus canadensis L. Pullman, July 26, 1915, E. G. Schaper & H. B. Humphrey, Arth. Herb.

Elymus condensatus Presl. Rolling Bay, June 2, 1919, Wash. Ured. 124; Seattle, Aug., 1919, Wash. Ured. 115; Pullman, Aug. 12, 1921, C. S. Parker, Herb. W.S.C. 900, Wash. Ured. 2795.

Elymus glaucus Buckl. Seattle, June, 1892, C. V. Piper 41 (Phytopath. 7:142, 1917); Mt. Vernon, June 14, 1916, H. B. Humphrey, Arth. Herb.; Friday Harbor, June 16, 1916, H. B. Humphrey, Arth. Herb.; Marysville, June 20, 1920, C. R. Stillinger 1203, Arth. Herb.; Olympia, July, 1920, C. R. Stillinger 1040, Arth. Herb.; Hoquiam, July 2, 1920, C. R. Stillinger 798, Arth. Herb., Wash. Ured. 1096; LaConner, Aug., 1921, Wash. Ured. 199; Pullman, Nov. 14, 1921, C. W. Hungerford, Wash. Ured. 1348; Nisqually River, Thurston Co., July 25, 1922, Wash. Ured. 1209.

Hordeum jubatum L. Selah, June 17, 1916, H. B. Humphrey, Arth. Herb.; Pullman, Aug. 29, 1916, C. W. Hungerford 16, Wash. Ured. 1352; Oakesdale, Sept. 25, 1916, C. W. Hungerford 42, Wash. Ured. 1353.

Hordeum nodosum L. Milltown, June 27, 1919, G. L. Zundel, Wash. Ured. 1271; Marysville, July 10, 1920, Wash. Ured. 360; Rolling Bay, July 25, 1920, Wash. Ured. 122; Pullman, Nov. 14, 1921, C. W. Hungerford, Wash. Ured. 1354; Hoquiam, Oct. 18, 1922, E. Bethel, Wash. Ured. 1073.

Sitanion jubatum Smith. Oakesdale, June 3, 1919, C. R. Stillinger, Arth. Herb.

Triticum vulgare Vill. Bellingham, June 3, 1915, F. K. Raun & A. G. Johnson, Arth. Herb.; Yakima, July 10, 1915, Arth. Herb., Wash. Ured. 244; Pullman, July 17, 1915, F. D. Heald, Herb. W.S.C. 105, Wash. Ured. 2717. (On Aug. 30, 1916, C. W. Hungerford made the following collections at Pullman on various varieties of wheat: On Columbian, Hungerford 18, Wash. Ured. 1355; on Little Club Wheat, Hungerford 20, Wash. Ured. 1356; on Alaska, Hungerford 21, Wash. Ured 1357; on Bearded Red Fife, Hungerford 22, Wash. Ured. 1358; on Polish Wheat, Hungerford 23, Wash. Ured. 1359.); Mt. Vernon, June 14, 1916, C. W. Hungerford 32A, Wash. Ured. 1360; Freeman, June 18, 1916, H. B. Humphrey, Arth. Herb.; Oakesdale, July, 1918, Wash. Ured. 123; Lacrosse, June 14, 1919, C. R. Stillinger, Arth. Herb.; Pleasant Prairie, June 29, 1919, F. D. Heald, Herb. W.S.C. 652, Wash. Ured. 1299; Snohomish, Aug. 15, 1919, E. W. Knight, Wash. Ured. 1189; Walla Walla, May 24, 1921, B. F. Dana, Herb. W.S.C. 854, Wash. Ured. 2791; Dixie, June 24, 1921, B. F. Dana, Herb. W.S.C. 854b, Wash. Ured. 1300; Kirkland, Nov. 12, 1921, Wash. Ured. 2661.

102. **Puccinia graminis** Pers.

Neues Mag. Bot. 1:119, 1794.
Lycoperdon poculiforme Jacq. Coll. Austr. 1:122, 1786.
Aecidium berberidis Pers. in J. F. Gmel. Syst. Nat. 2:1473, 1791.
Puccinia phlei-pratensis Erikss. & Henn. Zeit. f. Pflanzenkr. 4:140, 1894.
Dicaeoma poculiforme (Jacq.) Kuntze, Rev. Gen. 3³:466, 1898; N. Am. Flora 7:295, 1920.

On Berberidaceae: 0, I. Heteroecious.

Berberis vulgaris L. Pullman, July 11, 1899, R. M. Horner 1181, Herb. W.S.C.; also during 1916 and 1917 by F. D. Heald; also Oct. 3, 1917, C. W. Hungerford, Wash. Ured. 1346; Spokane, July 3, 1914, W. E. Flowers 6028, Wash. Ured. 2526; Mt. Vernon, June 22, 1922, B. F. Dana, Herb. W.S.C. 3488.

On Poaceae: II, III.

Arrhenatherum elatius (L.) Beauv. Pullman, Oct. 20, 1898, L. D. Malone, Arth. Herb.

Avena fatua L. Pullman, Oct. 23, 1916, E. C. Stakman, Arth. Herb.

Avena fatua glabrata Peterm. Olympic Marsh, Sept. 2, 1922, C. H. Bergstrom, Wash. Ured. 1035; Mt. Vernon, Sept. 2, 1922, C. H. Bergstrom, Wash. Ured. 1034.

Avena sativa L. Oak Harbor, Aug. 30, 1919, Wash. Ured. 346; Puyallup, Sept. 23, 1919, A. Frank, Wash. Ured. 420; Bothell, Oct. 15, 1921, Wash. Ured. 255; Olympia, Aug. 20, 1922, Wash. Ured. 349; Montesano, Aug. 24, 1922, Wash. Ured. 1028.

Bromus tectorum nudum Mert. & Koch. Pullman, Oct. 26, 1916, E. C. Stakman, Arth. Herb.

Cinna latifolia (Trev.) Griseb. Winslow, Oct. 10, 1921, Wash. Ured. 207.

Dactylis glomerata L. Winslow, June 2, 1919, Wash. Ured. 356.

Elymus canadensis L. Pullman, Oct. 23, 1916, E. C. Stakman, Arth. Herb.

Elymus condensatus Presl. Nespelem, Sept. 20, 1915, B. F. Dana, Herb. W.S.C. 371, Wash. Ured. 2756; Ritzville, Oct. 27, 1916, E. C. Stakman, Arth. Herb.; Colton, Aug. 20, 1919, Wash. Ured. 357; Pullman, Aug. 12, 1921, C. S. Parker, Wash. Ured. 2796.

Elymus glaucus Buckl. Pullman, Oct. 23, 1916, E. C. Stakman, Arth. Herb.

Elymus macounii Vasey. Ellensburg, Oct. 26, 1916, E. C. Stakman, Arth. Herb.

Elymus triticoides Buckl. Pasco, Oct. 7, 1916, E. C. Stakman, Arth. Herb.

Elymus sp. Pullman, Oct. 26, 1921, F. D. Heald, Herb. W.S.C. 753, Wash. Ured. 2773.

Festuca elatior L. Pullman, Oct. 22, 1916, E. C. Stakman, Arth. Herb.

Hordeum distichon palmella zeocriton L. (Rice- or Fan-barley). Pullman, Aug. 30, 1916, F. D. Heald and D. C. George, Herb. W.S.C. 410, Wash. Ured. 1302.

Hordeum jubatum L. Pullman, Oct. 22, 1916, E. C. Stakman, Arth. Herb.; also Nov. 14, 1918, C. W. Hungerford, Wash. Ured. 1345.

Hordeum nodosum L. Pullman, Oct. 23, 1916, E. C. Stakman, Arth. Herb.

Phleum pratense L. Prosser, Aug. 20, 1915, F. D. Heald, Herb. W.S.C. 217, Wash. Ured. 2737; Puyallup, Aug. 1, 1916. A. Frank, Wash. Ured. 425; Waitsburg, July 25, 1919, Wash. Ured. 345; Oak

Harbor, Aug. 20, 1919, Wash. Ured. 363; Olympia, June 26, 1920, C. R. Stillinger 714, Wash. Ured. 820; Pullman, Nov. 7, 1917, C. W. Hungerford, Wash. Ured. 1344; also Oct. 26, 1920, F. D. Heald, Herb. W.S.C. 752, Wash. Ured. 2772; Medina, Nov. 12, 1921, Wash. Ured. 238; Nisqually River, Thurston Co., July 25, 1922, Wash. Ured. 1208; Bellingham, Aug., 1922, E. Bethel; Westport, Sept. 6, 1922, Wash. Ured. 1040; Markham, Sept. 6, 1922, Wash. Ured. 1041; Aberdeen, Sept. 7, 1922, Wash. Ured 1044; Montesano, Sept. 7, 1922, Wash. Ured. 1043; Port Ludlow, Sept. 12, 1922, Wash. Ured. 1272; Port Townsend, Sept. 14, 1922, Wash. Ured. 1053.

Triticum compactium Host. Pullman, Oct. 22, 1916, E. C. Stakman, Arth. Herb.

Triticum vulgare Vill. Falcon Valley, Sept. 21, 1894, W. N. Suksdorf 399, Arth. Herb., Wash. Ured. 652; Yakima, July 7, 1915, F. D. Heald, Herb. W.S.C. 135, Wash. Ured. 2721; Rosalia, July 28, 1919, Wash. Ured. 147; Colton, Aug. 21, 1919, Wash. Ured. 361; Oak Harbor, Aug. 26, 1919, Wash. Ured. 129; Olympia, Sept. 30, 1919, Wash. Ured. 316; Kirkland, Nov. 12, 1921, Wash. Ured. 245; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 272.

103. Puccinia granulispora Ellis & Gall.

Bull. Torrey Club 22:61, 1895.
Dicaeoma granulisporum (Ellis & Gall.) Kuntze, Rev. Gen. 3³:469, 1898; N. Am. Flora 7:375, 1920.

On Liliaceae: 0, I, II, III. Autoecious.

Allium cernuum Roth. Friday Harbor, June 22, 1921, G. Howard, Wash. Ured. 1223.

Allium sp. Cape Horn, Aug. 19, 1894, W. N. Suksdorf 391, Arth. Herb., Wash. Ured. 642; Eatonville, Aug. 28, 1901, W. N. Suksdorf, Arth. Herb.

"This species agrees in all essentials with *Nigredo* (Uromyces) *bicolor* (Ellis) Arth. except in the possession of some two-celled teliospores. The forms are separately maintained for convenience, but should eventually be united under one name." N. Am. Flora 7:375, 1920.

104. Puccinia grindeliae Peck

Bot. Gaz. 4:127, 1879.
Puccinia solidaginis Peck, Bull. Torrey Club 11:49, 1884.
Puccinia bigeloviae Ellis & Ev., N. Am. Fungi 2248, hyponym, 1889.
Puccinia hyalomitra Diet. & Holw., Bot. Gaz. 19:304, 1894.
Micropuccinia grindeliae (Peck) Arth. & Jackson, Bull. Torrey Club 48:41. 1921; N. Am. Flora 7:576, 1922.

On Compositae: 0, III.

Solidago missouriensis Gray. Fort George Wright, July 4, 1914, W. E. Flowers 6023, Wash. Ured. 2521.

105. Puccinia grossulariae (Schum.) Lagerh.

Tromsö Mus. Aarsh. 17:60, 1895.
Aecidium grossulariae Schum. Enum. Pl. Saell. 2:223, 1803.
Puccinia pringsheimiana Kleb. Zeits. Pflanzenkr. 4:194, 1894
Puccinia magnusii Kleb. Zeits. Pflanzenkr. 5:79, 1895.
Puccinia albiperidia Arth. Jour. Myc. 8:53, 1902.
Puccinia riparia Holway, Jour. Myc. 10:163, 1904.
Puccinia uniporula Orton, Mycol. 4:201, 1912.
Dicaeoma grossulariae (Schum.) Kern, Trans. Am. Micr. Soc. 32:64, 1913; N. Am. Flora 7:355, 1920.

On Saxifragaceae: 0, I. Heteroecious.

Ribes acerifolium Howell. Mt. Olympus, Aug., 1907, J. B. Flett & C. V. Piper, Arth. Herb.

Ribes bracteosum Dougl. Hoquiam, July 2, 1920, C. R. Stillinger 757, Wash. Ured. 1087; Silverton, July 5, 1920, C. R. Stillinger 736, Wash. Ured. 839; Glacier, July 8, 1920, C. R. Stillinger 722, Wash. Ured. 827.

Ribes divaricatum Dougl. Chehalis, May 10, 1897, Coville & N. L. Britton 1005, N. Y. Bot. Gard., Arth. Herb.; Winslow, May 25, 1920, Wash. Ured. 158; Kirkland, Nov. 12, 1921, Wash. Ured. 313; Ilwaco, Sept., 1922, E. Bethel; Falcon Valley, July 12, 1908, W. N. Suksdorf 1093, Wash. Ured. 1202.

Ribes lacustre (Pers.) Poir. Sullivan Lake, Sept. 25, 1915, C. R. Stillinger 155, Wash. Ured. 802; Silverton, July 7, 1920, C. R. Stillinger 728, Wash. Ured. 833.

Ribes laxiflorum Pursh. Ilwaco, Sept., 1922, E. Bethel.

Ribes petiolare Dougl. Spokane, Aug. 11, 1914, W. E. Flowers 6019, Wash. Ured. 2518.

Ribes sanguineum Pursh. Ilwaco, Sept., 1922, E. Bethel.

On Cyperaceae: II, III.

Carex cryptocarpa C. Meyer. Bremerton, July 19, 1912, E. Bartholomew, Arth. Herb.; Winslow, Sept. 15, 1918, Wash. Ured. 85.

Carex magnifica Dewey. Bremerton, July 19, 1912, E. Bartholomew, Barth. Fungi Columb. 4461, Barth. N. Am. Ured. 1346, Arth. Herb.; Hoquiam, July 2, 1920, G. B. Posey & C. R. Stillinger 715, Wash. Ured. 821.

Carex nebraskensis Dewey. Falcon Valley, Sept. 2, 1886, W. N. Suksdorf 330, Wash. Ured. 605; Uniontown, Aug. 7, 1919, B. F. Dana, Herb. W.S.C. 682, Wash. Ured. 2762.

Carex sp. Ilwaco, Sept., 1922, E. Bethel.

106. Puccinia harknessii Vize

Grevillea 7:11, 1878.
Puccinia cladophila Pk. Bot. Gaz. 4:127, 1879.
Dicaeoma harknessii; (Vize) Kuntze, Rev. Gen. 3³:469, 1898; N. Am. Flora 7:436, 1921.

On COMPOSITAE: II, III (0, I unknown).

Ptiloria paniculata (Nutt.) Gr. Major Creek, Sept. 16, 1886, W. N. Suksdorf 1067, Wash. Ured. 765; Yakima, Aug. 4, 1898, C. V. Piper 611, Arth. Herb.; Bingen, Oct. 12, 1898, W. N. Suksdorf 549, Wash. Ured. 695; Spokane, Sept. 8, 1902, E. W. D. Holway, Arth. Herb.

Ptiloria tenuifolia (Torr.) Raf. Bingen, Sept. 19, 1886, W. N. Suksdorf 53, Wash. Ured. 509; Spokane, Sept. 8, 1912, E. W. D. Holway, Fungi Columb. 4665, N. Am. Ured. 1153, Arth. Herb.

107. Puccinia helianthi-mollis (Schw.) Jackson

Brooklyn Bot. Gard. Mem. 1:250, 1918.
Aecidium helianthi-mollis Schw. Schrift. Nat. Ges. Leipzig 1:68, 1822.
Puccinia helianthi Schw. Schrift. Nat. Ges. Leipzig 1:73, 1822.
Dicaeoma helianthi-mellis (Schw.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:427, 1921.

On COMPOSITAE: 0, I, II, III. Autoecious.

Helianthus annus L. Wawawai, Aug. 24, 1894, C. V. Piper 294, Wash. Ured. 2908; Bingen, Sept. 16, 1898, W. N. Suksdorf 548, Wash. Ured. 694; Pullman, Aug. 5, 1915, F. D. Heald and D. C. George, Herb. W.S.C. 172, Wash. Ured. 2731.

108. Puccinia hemisphaerica Ellis & Ev.

N. Am. Fungi 3144, 1894.
Aecidium hemisphaericum Peck. Bot. Gaz. 3:34, 1878.
Puccinia minussensis Thüm. Bull. Soc. Nat. Mosc. 53:214, 1878.
Dicaeoma hemisphaericum (Peck) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:438, 1921.

On COMPOSITAE: 0, I, II, III. Autoecious.

Lactuca pulchella (Pursh.) DC. Wawawai, May 12, 1894, C. V. Piper 261, Arth. Herb., Ellis & Ev. Fungi Columb. 1381b, Wash. Ured. 2893; Locke, July 19, 1917, W. E. Flowers 6008, Wash. Ured. 2507; Guler, June 29, 1919, F. D. Heald, Herb. W.S.C. 646, Wash. Ured. 1301.

109. Puccinia heterisiae Jackson

Bull. Torrey Club 47:471, 1920.
Puccinia aspera Diet. & Holw., Bull. Torrey Club 29:230, 1902. Not *P. aspera* Bon, 1869.
Micropuccinia heterisiae (Jackson) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:537, 1922.

On Saxifragaceae: 0, III.

Saxifraga mertensiana Bong. Mt. Adams, Aug. 7, 1897, W. N. Suksdorf 537 (type); also Aug. 14, 1897, Barth. N. Am. Ured. 619, Arth. Herb., Wash. Ured. 684.

110. Puccinia heucherae (Schw.) Diet.

Ber. d. Deutsch. Bot. Ges. 9:42, 1891.
Uredo heucherae Schw. Schrift. Nat. Ges. Leipzig 1:71, 1822.
Puccinia saxifragae Schlecht. Fl. Berol. 2:134, 1824.
Puccinia tiarellae B. & C. Grevillea 3:53, 1874.
Puccinia spreta Pk. Ann. Rep. N. Y. State Mus. 29:67, 1878.
Puccinia congregata E. & H. Bull. Calif. Acad. Sci. 1:26, 1884.
Micropuccinia heucherae (Schw.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:535, 1922.

On Saxifragaceae: 0, III.

Heuhcera cylindrica Dougl. Falcon Valley, July 26, 1883, W. N. Suksdorf 38, Ellis N. Am. Fungi 1463, Arth. Herb., Wash. Ured. 507; Bingen, May 29, 1884, W. N. Suksdorf; Port Orchard, July 15, 1895, C. V. Piper 433, Arth. Herb., Wash. Ured. 2913.

Heuchera glabella T. & G. Chiquash Mt., Aug. 28, 1895, W. N. Suksdorf 461, Wash. Ured. 674; Pullman, June 25, 1913, J. G. Hall, Arth. Herb.; Spokane, July 4, 1914, W. E. Flowers 6031, Wash. Ured. 2529.

Heuchera micrantha Dougl. Cape Horn, June 7, 1904, C. V. Piper, Herb. W.S.C.

Leptaxis menziesii (Pursh.) Raf. Lake Cushman, Aug., 1895, C. V. Piper 467, Herb. W.S.C., Wash. Ured. 1308; Seattle, July 12, 1898, C. V. Piper 436, Herb. W.S.C.; also by E. W. D. Holway, July 9, 1894; Medina, Nov. 15, 1919, G. Howard, Wash. Ured. 328.

Mitella breweri Gray. Chiquash Mts., Aug. 28, 1895, W. N. Suksdorf 456, Wash. Ured. 669; Skamania Co., Aug. 28, 1895, W. N. Suksdorf 535, Arth. Herb.; Mt. Rainier, Aug. 24, 1901, E. W. D. Holway, N. Am. Ured. 1149, Fungi Columb. 4965, Arth. Herb.

Mitella caulescens Nutt. Silverton, July 8, 1920, C. R. Stillinger 719, Wash. Ured. 825.

Mitella diversifolia Greene. Bingen, May 21, 1906, W. N. Suksdorf 1054, Wash. Ured. 754.

Mitella pentandra Hook. Mt. Adams, Sept. 21, 1899, W. N. Suksdorf 550, Wash. Ured. 696; Paradise Valley, Mt. Rainier, E. W. D. Holway, Aug. 23, 1901, Barth. N. Am. Ured. 1554, Arth. Herb.

Saxifraga arguta D. Don (Micranthes arguta (D. Don) Small). Mt. Adams, Aug. 7, 1885, W. N. Suksdorf 210, Wash. Ured. 557; also Sept. 21, 1899, W. N. Suksdorf 543, Wash. Ured. 689; Silverton, July 7, 1920, C. R. Stillinger, Arth. Herb.

Saxifraga bracteosa Suks. Bingen, Aug. 31, 1893, W. N. Suksdorf 260, Wash. Ured. 582.

Saxifraga fragosa Suks. Klickitat Co., Dec. 31, 1893, W. N. Suksdorf, Barth. N. Am. Ured. 454, Arth. Herb.

Saxifraga mertensiana Bong. Paradise Valley, Aug. 23, 1901, E. W. D. Holway 991, Barth. N. Am. Ured. 1451, Arth. Herb.

Saxifraga occidentalis Wats. Spangle, May 12, 1916, W. N. Suksdorf 1065, Wash. Ured. 763.

Tellima grandiflora (Pursh) Dougl. Seattle, Aug. 8, 1894, C. V. Piper 63, Arth. Herb.; White Salmon River, June 17, 1896, W. N. Suksdorf 534, Wash. Ured. 682; Bainbridge Is., July 24, 1909, E. Bartholomew, Barth. Fungi Columb. 3171, Arth. Herb.; Port Orchard, Aug. 1, 1912, E. Bartholomew, Barth. N. Am. Ured. 849, Arth. Herb.; Seattle, June, 1919, Wash. Ured. 134; Friday Harbor, July, 1919, G. Howard, Wash. Ured. 266; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 275; Ft. Lawton, May 26, 1922, D. Mullen, Wash. Ured. 958.

Tiarella trifoliata L. Seattle, Aug., 1892, C. V. Piper 40, Arth. Herb.; Peter's Prairie, Sept. 16, 1902, W. N. Suksdorf 790; Duckabush River, Aug. 9, 1912, E. Bartholomew, Barth. Fungi Columb. 4462, Arth. Herb.

Tiarella unifoliata Hook. Chenowith, July 7, 1894, W. N. Suksdorf 387, Wash. Ured. 637; Peter's Prairie, Sept. 16, 1902, W. N. Suksdorf 789, Wash. Ured. 723, Barth. N. Am. Ured. 745; Locke, Sept. 11, 1916, W. E. Flowers 6177, Wash. Ured. 2572.

111. **Puccinia hieraciata** (Schw.) Jackson

Brooklyn Bot. Gard. Mem. 1:251, 1918.
Caeoma (Aecidium) hieraciatum Schw. Trans. Am. Phil. Soc. II. 4:292, 1832.
Puccinia patruelis Arth, Mycol. 1:245, 1909.
Dicaeoma hieraciatum (Schw.) Arth. & Kern, N. Am. Flora 7:366, 1920.

On Compositae: 0, I. Heteroecious. (II, III on Cyperaceae).

Crepis intermedia Gray. Waitsburg, May 4, 1900, R. M. Horner 1436, Arth. Herb.

112. **Puccinia hieracii** (Schum.) Mart.

Fl. Mosq. 226, 1812.
Uredo hieracii Schum. Enum. Pl. Saell. 2:232, 1803.
Puccinia rugosa Billings, in S. Wats. Bot. King's Expl. 414, 1871.
Puccinia troximontis Peck, Bot. Gaz. 6:227, 1881.
Puccinia taraxaci Plowr., Brit. Ured. 186, 1889.
Puccinia sejuncta Sydow, Ann. Myc. 1:326, 1903.
Bullaria hieracii (Schum.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:513, 1922.

On Compositae: 0, II, III. Autoecious.

Agoseris aurantiaca (Hook.) Greene. Wenatchee, July, 1897, A. D. Elmer, Arth. Herb.

Agoseris elata (Nutt.) Greene. Pullman, June 23, 1892, W. R. Hull 173, Arth. Herb., Wash. Ured. 1312.

Agoseris glauca (Nutt.) Greene. Spangle, July 3, 1884, W. N. Suksdorf 157, Wash. Ured. 528.

Agoseris gracilenta (Gray) Greene. Mt. Adams, June 26, 1883, W. N. Suksdorf 54, Ellis N. Am. Fungi 1452, Wash. Ured. 510.

Agoseris grandiflora (Nutt.) Greene. Pullman, July 28, 1899, R. M. Horner 125, Arth. Herb.; Waitsburg, May 23, 1900, R. M. Horner 1455, Arth. Herb.

Agoseris heterophylla (Nutt.) Greene. Waitsburg, May 7, 1900, R. M. Horner 1438, Arth. Herb.

Agoseris sp. Mt. Adams, July 14, 1900, W. N. Suksdorf 600, Wash. Ured. 713.

Cichorium intybus L. Puyallup, Aug. 23, 1909, Barth. Fungi Columb. 3167, Arth. Herb.

Crepis acuminata Nutt. Bingen, May 27, 1884, W. N. Suksdorf 175, Wash. Ured. 542, Barth. N. Am. Ured. 540; Almota, June 30, 1894, C. V. Piper 246, Wash. Ured. 2899, Arth. Herb.

Crepis runcinata (James) T. & G. Yakima, Sept. 27, 1894, C. V. Piper 307, Wash. Ured. 2910.

Hieracium albiflorum Hook. Falcon Valley, June 23, 1893, W. N. Suksdorf 251, Arth. Herb., Barth. N. Am. Ured. 468; Trout Lake, July 17, 1894, W. N. Suksdorf 405, Wash. Ured. 656.

Hieracium canadense Michx. Spangle, Aug. 10, 1889, W. N. Suksdorf 1068, Wash. Ured. 766; Pullman, Aug. 5, 1893, C. V. Piper 473, Arth. Herb.; Falcon Valley, Aug. 6, 1893, W. N. Suksdorf 250, Barth. N. Am. Ured. 242, Arth. Herb., Wash. Ured. 575.

Hieracium columbianum Rydb. Newport, Sept., 1915, J. R. Weir 31, Arth. Herb.; Locke, Aug. 15, 1917, W. E. Flowers 6018, Wash. Ured. 2517.

Hieracium gracile Hook. Mt. Adams, July 14, 1900, W. N. Suksdorf 601, Wash. Ured. 714.

Hieracium scouleri Hook. Bingen, June 16, 1883, W. N. Suksdorf 67, Wash. Ured. 518; Pullman, June 27, 1898, C. V. Piper 381, Arth. Herb., Wash. Ured. 2925; Almota, June 30, 1898, C. V. Piper 245, Arth. Herb.; Spokane, Aug. 15, 1920, W. E. Flowers 6384, Wash. Ured. 1245.

This species, as interpreted by Arthur and Mains in N. Am.

Flora, is composed of several well marked races, which are morphologically indistinguishable. Some of these are familiar to many observers as independent species. For instance, those forms occurring on *Agoseris* have gone under the name *P. rugosa* Billings or *P. troximontis* Peck, those on Taraxacum as *P. taraxaci* Plowr. (cf. 165).

113. Puccinia holboellii (Hornem.) Rostr.

Meddelser om Groenland 3:534, 1888.
Aecidium holboellii Hornem. Fl. Dan. 37:11, 1840.
Puccinia barbarae Cooks, Grevillea 8:34, 1879.
Micropuccinia holboellii (Hornem.) Arth. & Jackson, Bull. Torrey Club 48: 41, 1921; N. Am. Flora 7:532, 1922.

On Cruciferae: 0, III.

A cruciferous plant. Fort Coville, 1861, Dr. Lyall 61, Kew Herb. Reported by Dr. Lyall as *P. barbarae* Cooke in the "Oregon Boundary Commission."

Arabis furcata Wats. Mt. Adams, July 29, 1885, W. N. Suksdorf 212, Wash. Ured. 559; Spokane, July 21, 1896, C. V. Piper 440, Wash. Ured. 2919.

Arabis holboellii Hornem. Spokane, May 5, 1914, W. E. Flowers 6292, Wash. Ured. 2583.

Arabis lyallii S. Wats. Mt. Adams, Aug. 7, 1885, W. N. Suksdorf 211, Arth. Herb., Wash. Ured. 588; Mt. Rainier, Aug., 1895, C. V. Piper 482, Arth. Herb.

114. Puccinia holcina Erikss.

Ann. Sci. Nat. VIII. 9:274, 1899.
Dicaeoma holcinum (Erikss.) Arth. & From., N. Am. Flora 7:311, 1920.

On Poaceae: II, III (0, I unknown).

Holcus lanatus L. Bainbridge Island, July 23, 1909, E. Bartholomew, Barth. Fungi Columb. 3172, Arth. Herb.; Rolling Bay, July 28, 1909, E. Bartholomew, N. Am. Ured. 41, Arth. Herb.; Alki Pt., Aug. 16, 1909, E. Bartholomew, Barth. Fungi Columb. 3173, Arth. Herb.; Bremerton, July 20, 1912, E. Bartholomew, N. Am. Ured. 851, Arth. Herb.; Puyallup, Oct. 3, 1918, A. Frank, Wash. Ured. 419; Startup, May 12, 1919, A. Frank, Wash. Ured. 441; Olympia, May 27, 1919, C. R. Stillinger, Arth. Herb.; Winslow, Oct. 13, 1919, H. H. Hotson, Wash. Ured. 327; Hoquiam, July 2, 1920, C. R. Stillinger & G. B. Posey 797, Arth. Herb., Wash. Ured. 1095; Langley, Aug., 1921, J. M. Grant, Wash. Ured. 301; Ft. Lawton, May 27, 1922, D. Mullen, Wash. Ured. 961; Coupeville, June 20, 1922, Wash. Ured. 981; Seattle, Sept., 1922, Wash. Ured. 1190.

This is a very common rust on velvet grass in western Washing-

ton. It should not be confused with *P. rhamni*, which has uredinia and telia on the same host. The teliospores can be readily distinguished by the apical projections of *P. rhamni*. These species are more difficult to distinguish if only urediniospores are present. Those of *P. holcina* are somewhat larger, measuring 19-24 by 23-27 μ and globoid, while those of *P. rhamni* are globoid or broadly ellipsoid measuring 16-20 by 18-24 μ.

The mycelium of this rust remains viable in the host all winter, producing fresh crops of urediniospores from time to time. In early spring these spores infect the leaves of the young Holcus plants. It thus does not require the aecial stage to perpetuate itself.

115. Puccinia intermixta Peck

Bot. Gaz. 4:218, 1879.
Aecidium intermixtum Peck, Bot. Gaz. 4:231, 1879.
Dicaeoma intermixtum (Peck) Kuntze, Rev. Gen. 3[3]:469, 1898.
Allodus intermixta (Peck) Arth. Result. Sci. Congr. Bot. Vienne 345: 1906; N. Am. Flora 7:474, 1921.

On Compositae: 0, I, III. Autoecious.

Iva axillaris Pursh. Pasco, July 11, 1897, C. V. Piper 411, Wash. Ured. 2921; Spokane, Aug. 10, 1913, W. E. Flowers 6117, Wash. Ured. 2551; Wenatchee, Aug. 16, 1916, J. R. Weir, Barth. N. Am. Ured. 2104, Arth. Herb.; Ephrata, June 27, 1921, C. S. Parker, Herb. W.S.C. 849, Wash. Ured. 2790.

116. Puccinia interveniens (Peck) Bethel

Univ. Calif. Publ. Bot. 7:119, 1919.
Roestelia interveniens Peck, Bull. Torrey Club 10:74, 1883.
Aecidium roestelioides Ellis & Ev. Jour. Myc. 1:93, 1885.
Aecidium malvastri P. Henn. Hedwigia 36:216, 1897.
Aecidium interveniens Farl. Bibl. Index N. Am. Fungi, 1:58, 1905.
Dicaeoma interveniens (Peck) Arth. & Fromme, N. Am. Flora 7:299, 1920.

On Malvaceae: 0, I (III on Poaceae, opsis form).

Sidalcea oregona Gray. Spangle, June 26, 1884, W. N. Suksdorf 144, Wash. Ured. 525.

Sidalcea sp. Spokane, June 2, 1913, W. E. Flowers 6127, Wash. Ured. 2557.

Sphaeralcea rivularis (Dougl.) Torr. Spokane, June 26, 1884, W. N. Suksdorf, Arth. Herb.

"*Puccinia interveniens* is an heteroecious opsis-Puccinia (allodus), the only one known on grasses. The aecia occur on several genera of the Malvaceae in the West. *Puccinia burnettii*, which is placed as a synonym of *P. interveniens* in the N. Am. Flora (l. c.), has uredinia and telia but the aecial host is unknown." (From a letter from Prof. Jackson).

117. Puccinia iridis (DC.) Rabenhorst

Krypt. Fl. Deutschl. 1:23, 1844.
Uredo iridis DC. Poir. in Lam. Encycl. 8:224, 1808.
Dicaeoma iridis (DC.) Kuntze, Rev. Gen. 3²:469, 1898; N. Am. Flora 7:379, 1920.

On IRIDACEAE: II, III (0, I unknown).

Iris missouriensis Nutt. Falcon Valley, Sept. 21, 1894, W. N. Suksdorf 400, Arth. Herb., Barth. N. Am. Ured. 43, Wash. Ured. 654; Yakima, July 10, 1915, Arth. Herb., Wash. Ured. 76.

118. Puccinia jonesii Peck

Bot. Gaz. 6:226, 1881.
Puccinia cymopteri Diet. & Holway, Bot. Gaz. 18:255, 1893.
Puccinia traversiana Sydow, Monog. Ured. 1:889, 1904.
Allodus jonesii (Peck) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:463, 1921.

On UMBELLIFERAE: 0, I, III.

Cogswellia gormani (How.) Jones. Spokane, July 6, 1920, W. E. Flowers 6410, Wash. Ured. 1254.

Cogswellia macrocarpa (Nutt.) Jones. Pullman, Apr., 1895, C. V. Piper 476, Arth. Herb.

Cogswellia suksdorfii (Wats.) Jones. West Klickitat Co., July 15, 1883, W. N. Suksdorf 77, Wash. Ured. 521; Husum, May, 1884, W. N. Suksdorf 173, Wash. Ured. 541; Klickitat River, Klickitat Co., Aug. 12, 1919, Geo. Zundel, Arth. Herb.

Cogswellia triternata (Pursh) Jones. Bingen, June 24, 1886, W. N. Suksdorf 315, Wash. Ured. 591.

Cogswellia sp. Pullman, Apr. 23, 1915, F. D. Heald & D. C. George, Herb. W.S.C. 12, Wash. Ured. 2703; Connell, July, 1916, B. F. Dana, Herb. W.S.C., Wash. Ured. 1296.

Leptotaenia multifida Nutt. Pullman, June 4, 1894, C. V. Piper 264, Arth. Herb., Wash. Ured. 1191; Walla Walla, June 29, 1899, C. L. Shear, Arth. Herb.; Waitsburg, June 2, 1900, R. M. Horner, Arth. Herb.; Spokane, July 10, 1914, W. E. Flowers 6014, Wash. Ured. 2513.

Leptotaenia purpurea (Wats.) C. & R. Bingen, May 23, 1884, W. N. Suksdorf 169, Wash. Ured. 537; West Klickitat Co., May, 1884, W. N. Suksdorf 242, Arth. Herb.

119. Puccinia koeleriae Arth.

Mycologia 1:247, 1909.
Dicaeoma koeleriae (Arth.) Arth. & From., N. Am. Flora 7:325, 1920.

On BERBERIDACEAE: 0, I. Hetereocious.

Berberis aquifolium Pursh. Sumner, June 14, 1916, A. Frank, Wash. Ured. 445; Oak Harbor, Aug. 27, 1919, Wash. Ured. 315;

Seattle, Sept., 1920, Wash. Ured. 186; Langley, May 17, 1921, A. Reuter, Wash. Ured. 1192; Lacey, July 24, 1922, Wash. Ured. 997; Olympia, July 24, 1922, Wash. Ured. 996; Winslow, July 30, 1922, Wash. Ured. 1207; Port Orchard, June 9, 1923, A. J. Sultzer, Wash. Ured. 1812.

Berberis repens Lindl. Spokane, July 4, 1914, W. E. Flowers 6004, Wash. Ured. 2503.

On Poaceae: II, III.

Koeleria cristata (L.) Pers. Spokane, Sept. 26, 1912, W. E. Flowers 6120, Wash. Ured. 2553.

120. Puccinia lapsanae Fuckel

Symb. Myc. 53, 1869.
Aecidium lapsanae Schultz Prodr. Fl. Stargard 454, 1806.
Dicaeoma lapsanae (Schultz) Kuntze, Rev. Gen. 3³:469, 1898; N. Am. Flora 7:435, 1921.

On Compositae: 0, I, II, III. Autoecious.

Lapsana communis L. Yarrow, Oct., 1920, Grace Howard, Wash. Ured. 191; Tacoma, March 29, 1924, T. C. Frye, Wash. Ured. 1330.

121. Puccinia leveillei Mont.

in C. Gay Fl. Chil. 8:41, 1852.
Puccinia geranii Lev. Ann. Sci. Nat. III. 5:270, 1846. Not *P. geranii* Corda, 1840.
Micropuccinia leveillei (Mont.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:540, 1922.

On Geraniaceae: 0, III.

Geranium incisum Nutt. Waitsburg, May, 1900, R. M. Horner, Ellis & Ev. Fungi Columb. 1572, Arth. Herb.

Geranium viscosissimum Fisch. & May. Pullman, June 24, 1914, B. F. Dana, Herb. W.S.C. 302, Wash. Ured. 2746.

122. Puccinia ligustici Ellis & Ev.

Bull. Torrey Club 22:363, 1895.
Puccinia luteobasis Ellis & Ev. Bull. Torrey Club 24:457, 1897.
Micropuccinia ligustici (Ellis & Ev.) Arth. & Jackson, Bull Torrey Club 48:42, 1921; N. Am. Flora 7:552, 1922.

On Umbelliferae: 0, III.

Ligusticum apiifolium (Nutt.) Gray. Mt. Rainier, Aug. 23, 1901, E. W. D. Holway, Barth. N. Am. Ured. 1456, Arth. Herb.

Ligusticum grayi C. & R. Mt. Rainier, Aug., 1895, C. V. Piper 449, Wash. Ured. 2918.

Ligusticum sp. Mt. Adams, July 14, 1900, W. N. Suksdorf 599, Arth. Herb.

"This species is correlated with *Dicaeoma bistortae* (*Puccinia*

bistortae) the telial characters of the two species being quite similar, as well as the habitats, and the family to which the hosts of the short-cycled form belong being the same as that of the known aecial host of the heteroecious species." N. Am. Flora 7:522, 1922.

123. Puccinia linkii Klotzsch

Linnaea 8:490, 1833.
Puccinia pringlei Peck, Bot. Gaz. 6:275, 1881.
Micropuccinia linkii (Klotzsch) Arth. & Jackson; Bull. Torrey Club 48:42, 1921; N. Am. Flora 7:569, 1922.

On Caprifoliaceae: 0, III.

Viburnum pauciflorum Pyl. Lake Chelan, Aug. 26, 1916, J. R. Weir 14438, Arth. Herb.; Locke, Aug. 25, 1918, W. E. Flowers 6145, Wash. Ured. 1239.

124. Puccinia macclatchieana Diet. & Holw.

Erythea 2.127, 1894.
Dicaeoma macclatchieanum (Diet. & Holw.) Arth. N. Am. Flora 7:342, 1920.

On Cyperaceae: II, III. Heteroecious. (0, I unknown).

Scirpus microcarpus Presl. Seattle, Aug., 1893, C. V. Piper, Arth. Herb.; Falcon Valley, Oct. 1, 1902, W. N. Suksdorf 1091, Wash. Ured. 788; Bothell, Nov. 12, 1921, Wash. Ured. 253; Medina, Nov. 12, 1921, Wash. Ured. 252; Kirkland, Nov. 12, 1921, Wash. Ured. 251; Houghton, Nov. 2, 1921, Wash. Ured. 232; Battleground, Aug. 7, 1922, Wash. Ured. 1020; Bush Prairie, Aug. 7, 1922, Wash. Ured. 1019; Willapa, Aug. 23, 1922, Wash. Ured. 1023; Ilwaco, Aug. 24, 1922, Wash. Ured. 1025; Nesel River, Aug. 24, 1922, Wash. Ured. 1030; Bay Center, Aug. 24, 1922, Wash. Ured. 1026; Raymond, Aug. 30, 1922, Wash. Ured. 1033; Chehalis, Sept. 2, 1922, Wash. Ured. 1037; Ocosta, Sept. 7, 1922, Wash. Ured. 1049; Markham, Sept. 7, 1922, Wash. Ured. 1048; Westport, Sept. 7, 1922, Wash. Ured. 1045; Aberdeen, Sept. 7, 1922, Wash. Ured. 1047; Hoquiam, Sept. 7, 1922, Wash. Ured. 1046; Dabob, Sept. 8, 1922, Wash. Ured. 1050; Montesano, Sept. 8, 1922, Wash. Ured. 1051; Shine, Sept. 11, 1922, Wash. Ured. 1052; Winslow, Oct. 20, 1923, Wash. Ured. 1219.

It will be observed that in this paper the specific name is always begun with a small letter irrespective of its derivation. It would seem wise in the case of the rust under consideration to modify the specific name slightly to conform to this general rule. Dietel and Holway writes the name thus, *Puccinia McClatchieana.*

125. Puccinia majanthae (Schum.) Arth. & Holw.

Bull. Lab. Nat. Hist. Univ. Iowa 5:188, 1901.
Puccinia sessilis Schneider, Schröter Abh. Schles. Ges. 49:19, 1870.
Dicaeoma majanthae (Schum.) Arth. Proc. Ind. Acad. Sci. 1903; 149, 1904; N. Am. Flora 7:298, 1920.

On Liliaceae: 0, I. Heteroecious. (II, III on Poaceae).

Vagnera sessilifolia (Baker) Greene. Spokane, July 12, 1910, W. E. Flowers 6419, Wash. Ured. 1153; Chelan, Aug., 1916, J. R. Weir 11230, Arth. Herb.

126. Puccinia malvacearum Bertero

in C. Gay, Fl. Chil. 8:43, 1852.
Micropuccinia malvacearum (Bertero) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:542, 1922.

On Malvaceae: 0, III.

Althaea rosea (L.) Cav. Bingen, July 1, 1900, W. N. Suksdorf 610, Wash. Ured. 719; Bremerton, E. Bartholomew, Barth. Fungi Columb. 4463, Arth. Herb.; Spokane, June 10, 1914, W. E. Flowers 6290, Wash. Ured. 2581; Yakima, July 4, 1914, Wash. Ured. 350; Clarkston, July 5, 1915, B. F. Dana, Herb. W.S.C. 82, Wash. Ured. 2713; Puyallup, Oct. 25, 1916, A. Frank, Wash. Ured. 433; Winslow, Dec. 10, 1918, Wash. Ured. 197; Pullman, July 1, 1920, G. L. Zundel, Wash. Ured. 161; Sumner, Oct. 5, 1920, Wash. Ured. 189; Walla Walla, June 23, 1921, B. F. Dana, Herb. W.S.C. 805, Wash. Ured. 2786; Langley, Aug., 1921, J. M. Grant, Wash. Ured. 299; Seattle, Nov. 8, 1921, Wash. Ured. 225; Georgetown, Nov. 10, 1921, Wash. Ured. 229; Lacey, July 24, 1922, Wash. Ured. 998; Tenino, Aug. 18, 1922, Wash. Ured. 1193; Woodland, Aug. 16, 1922, Wash. Ured. 1021.

Malva rotundifolia L. Bingen, Nov. 10, 1903, W. N. Suksdorf 967, Wash. Ured. 733; Olympia, Sept. 12, 1912, E. Bartholomew, Barth. N. Am. Ured. 1162, Arth. Herb.; Wawawai, June 7, 1915, D. C. George, Herb. W.S.C. 23, Wash. Ured. 2704; Yakima, June 18, 1915, F. D. Heald, Herb. W.S.C. 43, Wash. Ured. 2709; Clarkston, Aug. 14, 1915, F. D. Heald & D. C. George, Herb. W.S.C. 193, Wash. Ured. 2732; Pullman, June 20, 1916, B. F. Dana, Herb. W.S.C. 280, Wash. Ured. 2745; Walla Walla, May 30, 1919, C. R. Stillinger, Arth. Herb.; Spokane, Oct. 4, 1920, C. R. Stillinger 741, Wash. Ured. 844; Winslow, Nov. 4, 1921, Wash. Ured. 312; Seattle, Nov. 9, 1921, Wash. Ured. 228; Georgetown, Nov. 10, 1921, Wash. Ured. 230; Bothell, Nov. 12, 1921, Wash. Ured. 253; Medina, Nov. 12, 1921, Wash. Ured. 262; Kirkland, Nov. 12, 1921, Wash. Ured. 257; Raymond, Aug., 1922, Wash. Ured. 1214; Ilwaco, Aug., 1922, Wash. Ured. 1215; Bay Center, Aug., 1922, Wash. Ured. 1216; Oysterville,

Aug., 1922, Wash. Ured. 1217; Aberdeen, Aug., 1922, Wash. Ured. 1218.

Malva sylvestris L. Seattle, Nov. 8, 1921, Wash. Ured. 226; Winslow, Oct. 2, 1922, Wash. Ured. 1068.

Malva sp. Bingen, June 10, 1903, W. N. Suksdorf 966, Wash. Ured. 732.

127. Puccinia melanconioides Ellis & Hark.

Bull. Calif. Acad. 1:27, 1884.
Allodus melanconioides (Ellis & Hark.) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:464, 1921.

On Primulaceae: 0, I, III. Autoecious.

Dodecatheon puberulum (Nutt.) Piper. Locke, June 13, 1916, W. E. Flowers 6350, Wash. Ured. 2600.

This species resembles *P. ortonii*, a Eu-type.

128. Puccinia menthae Pers.

Sny. Fungi 227, 1801.
Aecidium menthae Sow. Engl. Fungi pl. 398, f. 3, 1803.
Puccinia clinopodii DC. Fl. Fr. 6:67, 1815.
Puccinia menthae americana Burrill, Bull. Ill. Lab. Nat. Hist. 2:191, 1885.
Dicaeoma menthae (Pers.) S. F. Gray, Nat. Arr. Brit. Pl. 1:542, 1821; N. Am. Flora 7:405, 1921.

On Labiatae: 0, I, II, III. Autoecious.

Mentha canadensis L. Falcon Valley, July 31, 1885, W. N. Suksdorf 204, Wash. Ured. 554; Bingen, July 22, 1893, W. N. Suksdorf 254, Barth. N. Am. Ured. 246, Arth. Herb., Wash. Ured. 578; Pullman, Aug. 16, 1894, C. V. Piper 506, Arth. Herb.; Lake Park, July 27, 195, C. V. Piper 485, Arth. Herb., Wash. Ured. 2914; Seattle, Oct. 1, 1900, C. V. Piper 759, Arth. Herb.; also Dec. 10, 1909, T. C. Frye, Arth. Herb., Wash. Ured. 69; Rolling Bay, July 30, 1912, E. Bartholomew, Fungi Columb. 4464, Herb. W.S.C.; Spokane, Sept. 10, 1914, W. E. Flowers 6016, Wash. Ured. 2515; Kennewick, Aug. 18, 1915, F. D. Heald, Herb. W.S.C. 208, Wash. Ured. 2734; Locke, Sept. 14, 1916, W. E. Flowers 6017, Wash. Ured. 2516; Puyallup, Oct. 20, A. Frank, Wash. Ured. 447; Deep Creek, Sept. 24, 1920, G. L. Zundel, Wash. Ured. 2770.

Mentha spicata L. Bingen, May 18, 1904, W. N. Suksdorf 975, Wash. Ured. 740; Bremerton, Aug. 2, 1912, E. Bartholomew, Barth. Fungi Columb. 4465, Arth. Herb.; Seattle, June, 1914, Wash. Ured. 73.

Mentha sp. Chelan, Aug., 1916, J. R. Weir 11219, Arth. Herb.; Mineral, July 26, 1921, J. S. Boyce 886, Arth. Herb.

129. Puccinia mesomajalis Berk. & Curt.

Ann. Rep. N. Y. State Mus. 25:111, 1873.
Micropuccinia mesomajalis (Berk & Curt.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:524, 1922.

On Liliaceae: 0, III.

Clintonia uniflora Kunth. Bingen, June 5, 1883, W. N. Suksdorf 57, Wash. Ured. 511; Skamania Co., July 22, 1894, W. N. Suksdorf, N. Am. Ured. 48; Mt. Adams, Sept. 5, 1900, W. N. Suksdorf 604, Wash. Ured. 77; Mt. Rainier, Aug. 26, 1901, E. W. D. Holway, Herb. W.S.C.; Mt. Baldy, July, 1904, G. H. Martin, Wash. Ured. 348; east side of Mt. Adams, Aug. 25, 1907, W. N. Suksdorf 1059, Wash. Ured. 758; Locke, July 2, 1915, W. E. Flowers 6036, Wash. Ured. 2533; Silverton, July 8, 1920, C. R. Stillinger 720, Wash. Ured. 852; Sol Duc Hot Springs, July 14, 1920, J. S. Boyce 627, Wash. Ured. 2854.

130. Puccinia micromeriae Dudley & Thompson

Jour. Myc. 10:54, 1904.
Dicaeoma micromeriae (Dudley & Thompson) Arth. N. Am. Flora 7:406, 1921.

On Labiatae: 0, I, II, III. Autoecious.

Micromeria chamissonis (Benth.) Greene. Husum, June 26, 1893, W. N. Suksdorf 241, Wash. Ured. 567; Bingen, June 21, 1894, W. N. Suksdorf 412, Wash. Ured. 662; Port Orchard, July 23, 1895, C. V. Piper 424, Herb. W.S.C.; Locke, Sept. 20, 1917, W. E. Flowers 6181, Wash. Ured. 2573.

131. Puccinia millefolii Fuckel

Jahrb. Nass. Ver. Nat. 23-24:55, 1870.
Puccinia conferta Diet. & Holw., Erythea 7:250,1893.
Puccinia recondita Diet. & Holw., Erythea 2:128, 1894. Not *P. recondita* Roberge, 1857.
Puccinia artemisiicola Sydow Monog. Ured. 1:14, 1902.
Micropuccinia millefolii (Fuckel) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:582, 1922.

On Compositae: 0, III.

Achillea millefolium L. Hartford, July 9, 1920, G. B. Posey & C. R. Stillinger 735, Wash. Ured. 838; Aberdeen, Oct., 1922, E. Bethel, Wash. Ured. 1076. Mr. E. Bethel reports collecting this rust during October, 1922, on the above host at Montesano, Oakville, Elmer, Wishkali, Ocosta, Cosmopolis and Hoquiam.

Artemisia suksdorfii Piper. Pullman, July 28, 1894, C. V. Piper 270, Arth. Herb.; Bainbridge Is., Aug. 17, 1909, E. Bartholomew, Barth. Fungi Columb. 3169, Arth. Herb.

Ramona incana (Benth.) Dougl. Spokane, June 11, 1919, W. E. Flowers 6287, Wash. Ured. 1242.

132. Puccinia monoica (Pk.) Arth.

Mycologia 4:61, 1912.
Aecidium monoicum Peck, Bot. Gaz. 4:230, 1879.
Dicaeoma monoicum (Peck) Arth. & From., N. Am. Flora 7:312, 1920.

On Cruciferae: 0, I. Heteroecious. (II, III on Poaceae).

Arabis canescens (Nutt.) T. & G. (*A. puberula* Nutt.). Klickitat River, June 12, 1885, W. N. Suksdorf 357, Wash. Ured. 619.

Arabis cusickii S. Wats. Ellensburg, May 20, 1897, C. V. Piper 414, Arth. Herb.

Arabis holboellii Hornem. Spokane, Apr. 10, 1919, W. E. Flowers 6013, Wash. Ured. 2512; Locke, May 5, 1916, W. E. Flowers 6113, Wash. Ured. 1236.

Arabis whitedii Piper. Cashmere, Apr., 1910, V. Pease, Arth. Herb.

Parrya menziesii Gr. Columbus, Apr. 13, 1886, W. N. Suksdorf 334, Wash. Ured. 609.

133. Puccinia mutabilis Ellis & Gall.

Jour. Myc. 5:67, 1889.
Dicaeoma mutabile (Ellis & Gall.) Kuntze, Rev. Gen. 3[3]:469, 1898; N. Am. Flora 7:373, 1920.

On Liliaceae: 0, I, II, III. Autoecious.

Allium geyeri S. Wats. Ellensburg, June 1, 1897, C. V. Piper 439, Arth. Herb.

Allium textile Nelson & Macbr. Spokane, 1918, J. R. Weir 12981, Arth. Herb.

134. Puccinia nuda Ellis & Ev.

Jour. Myc. 3:57, 1887; N. Am. Flora 7:598, 1922.
Puccinia hemizoniae Ellis & Tracy, Jour. Myc. 7:43, 1891.
Puccinia lagophyllae Diet. & Holw.; Erythea 1:250, 1893.
Puccinia madiae Sydow, Monog. Ured. 1:121, 1902.

On Compositae: II, III (0, I unknown).

Lagophylla ramossissima Nutt. Bingen, July 1, 1892, W. N. Suksdorf 1069, Wash. Ured. 767; Klickitat Co., Aug. 26, 1893, W. N. Suksdorf, issued as Barth. N. Am. Ured. 453, Arth. Herb.; Pullman, July 25, 1898, C. V. Piper 593, Arth. Herb.

Madia sativa Moline. Bingen, June 28, 1900, W. N. Suksdorf 603, Barth. N. Am. Ured. 1060, Wash. Ured. 716; Falcon Valley, July 10, 1900, W. N. Suksdorf 595, Wash. Ured. 708.

Madia sp. Falcon Valley, July 30, 1885, W. N. Suksdorf 200, Arth. Herb., Wash. Ured. 550, distributed as on "Arnica foliosa Nutt."

The above disposition of *P. hemizoniae* E. & T., *P. madiae* Sydow

and *P. lagophyllae* Diet. & Holw. as synonyms of *P. nuda* E. & E. is in accordance with Jackson's arrangement as given in Mycologia 14:115, 1922, and also as in the N. Am. Flora, 7:598, 1922.

135. Puccinia obscura Schroet.

Pass. Nuovo Giorn. Bot. Ital. 9:256, 1877.
Aecidium bellidis Thüm. Fungi Austr. 635, hyponym, 1873.
Dicaeoma obscurum (Schroet.) Kuntze, Rev. Gen. 3³:469, 1898; N. Am. Flora 7:370, 1920.
Puccinia bellidis Lagerh. Bol. Soc. Broter. 8:134, 1890.
Puccinia luzulae-maximae Dietel, Ann. Myc. 17:57, 1919.

On Juncaceae: II, III. Heteroecious.-(0, I, on Compositae but not found in America).

Juncoides campestre (L.) Kuntze. Bingen, May 21, 1894, W. N. Suksdorf 409, Wash. Ured. 659.

Juncoides parviflorum (Ehrh.) Cov. Eatonville, Aug. 28, 1901, E. W. D. Holway, Barth. N. Am. Ured. 558 and 1462, Arth. Herb.; Bremerton, July 31, 1912, E. Bartholomew, Arth. Herb.; Bothell, Nov. 12, 1921, Wash. Ured. 263; Willapa, Aug. 23, 1922, Wash. Ured. 1024; Bay Center, Aug. 24, 1922, Wash. Ured. 1027; Seattle, June 8, 1924, M. Myers, Wash. Ured. 1337.

136. Puccinia ortonii Jackson

Brooklyn Bot. Gard. Mem. 1:259, 1918.
Dicaeoma ortonii (Jackson) Arth., N. Am. Flora 7:400, 1920.

On Primulaceae: 0, I, II, III. Autoecious.

Dodecatheon tetrandrum Suks. Mt. Adams, Aug. 31, 1886, W. N. Suksdorf 324, Barth. N. Am. Ured. 554 and 1457, Arth. Herb., Wash. Ured. 599 and 600; Chiquash Mt., Aug. 28, 1898, W. N. Suksdorf 324b; Wash. Ured 1194.

This species resembles *P. melanconioides* which occurs on the same host. It is, however, distinguished by producing uredinia in its life cycle, which the latter does not have. The two species are probably correlated forms.

137. Puccinia pallido-maculata Ellis & Ev.

Holway N. Am. Ured. 1:49, 1906.
Micropuccinia pallido-maculata (E. & E.) Arth. & Jackson, N. Am. Flora 7:535, 1922.

On Saxifragaceae: 0, III.

Saxifraga odontoloma Piper. (*S. arguta* D. Don.). Mt. Adams, Oct. 1, 1898, W. N. Suksdorf 355, Wash. Ured. 617. Reported by E. W. D. Holway in his N. Am. Ured. 1:49, 1906.

138. Puccinia complicata (Arth. & Orton) comb. nov.

Puccinia palmeri Diet. & Holw. Erythea 7:98, excl. synonymy, 1899.
Allodus palmeri Orton, Mem. N. Y. Bot. Gard. 6:202, 1916. Not *A. palmeri* Arth. 1906.
Allodus complicata Arth. & Orton, N. Am. Flora 7:472, 1921.

On Scrophulariaceae: 0, I, III. Autoecious.

Pentstemon confertus Dougl. Lake Chelan, Aug. 26, 1916, J. R. Weir 14442, Arth. Herb.

Pentstemon pinetorum Piper. Selah, July 7, 1893, C. V. Piper 130, Arth. Herb.

Pentstemon venustus Dougl. Dayton, Sept. 4, 1922, E. Bethel, Wash. Ured. 1195.

Pentstemon sp. Lake Chelan, Aug. 26, 1916, J. R. Weir 15842, Arth. Herb.; Medaline Falls, Sept. 26, 1915, J. R. Weir 15527, Arth. Herb.

This species should not be confused with *P. pentstemonis* Peck, a short-cycled form occurring on the same host. The presence of aecia readily distinguishes *P. complicata.*

139. Puccinia parkerae Diet. & Holw.

Erythea 3:78, 1895.
Micropuccinia parkerae (Diet. & Holw.) Arth. & Jackson, N. Am. Flora 7:539, 1922.

On Saxifragaceae: 0, III.

Ribes lacustre (Pers.) Poir. Seattle, June, 1894, A. M. Parker, Wash. Ured. 63, Holw. N. Am. Ured. 52, Arth. Herb.; Chiquash Mt., July 20, 1894, W. N. Suksdorf 408, Wash. Ured. 658; Winslow, June 25, 1920, Wash. Ured. 351.

This short-cycled rust has teliospores resembling those of *P. grossulariae* which has its aecia on Ribes. *P. ribis,* another short-cycled form, has been reported on *Ribes triste.* The latter species, however, has verrucose teliospores, while those of *P. parkerae* are smooth. All three species occur in Washington.

140. Puccinia pattersoniana Arth.

Bull. Torrey Club 33:29, 1906.
Dicaeoma pattersonianum (Arth.) Arth. & From., N. Am. Flora 7:330, 1920.

On Liliaceae: 0, I. Heteroecious.

Hookera douglasii (Wats.) Piper. Pullman, May 22, 1894, C. V. Piper, Arth. Herb.; Spokane, A. A. Heller 2940, Apr. 21, 1896, Arth. Herb.; Locke, May 1, 1918, W. E. Flowers 6179, Wash. Ured. 1101.

On Poaceae: II, III.

Sitanion jubatum Smith. Oakesdale June 5, 1919, C. R. Stillinger, Arth. Herb.

This rust is distinguished from other grass rusts by its verrucose teliospores with the markings arranged in longitudinal lines. The pedicels of the teliospores are stained dark blue by iodine, a characteristic seen also in *P. moreniana,* a short-cycled form found in California, and probably related to the rust under consideration. It has recently been definitely shown that the aecial stage of *P. pattersoniana* occurs on species of *Brodiaea* (Hookera) (Mains, E. B. Ind. Acad. Sci. 1921: 133-135, and Garrett, A. O. Mycologia 16:33-35, 1924). This stage usually has been considered the aecial stage of *Uromyces brodiaeae* E. & E.

141. Puccinia pentstemonis Peck

Bull. Torrey Club 12:35, 1885.
Micropuccinia pentstemonis (Peck) Arth. & Jackson, N. Am. Flora 7:565, 1922.

On Scrophluariaceae: 0, III.

Pentstemon confertus Dougl. Pullman, June 28, 1898, C. V. Piper 377, Wash. Ured. 2923.

This species should not be confused with *P. complicata,* an opsis form occurring on the same host (cf. 138).

142. Puccinia phaceliae Syd. & Holw.

Sydow Monog. Ured. 1:314, 1902.
Micropuccinia phaceliae (Syd. & Holw.) Arth. & Jackson, N. Am. Flora 7:557, 1922.

On Hydrophyllaceae: 0, III.

Phacelia sericea (Graham) Gray. Mt. Rainier, Aug. 23, 1901, E. W. D. Holway (type specimen), Arth. Herb., Barth. N. Am. Ured. 1464.

This rust resembles rather closely other micro-forms coming on the Hydrophyllaceae. In *P. hydrophylli* the teliospores are closely and finely verrucose while those of *P. phaceliae* are smooth and those of *P. romanzoffiae,* reported for Oregon, are marked by large sparsely distributed, irregular tubercles.

143. Puccinia pimpinellae (Str.) Mart.

Fl. Mosq. ed. 2:226, 1817.
Uredo pimpinellae Strauss, Ann. Wett. Ges. 2:102, 1810.
Puccinia osmorrhizae Cke. & Peck, Ann. Rep. N. Y. State Mus. 29:73, 1878.
Puccinia trifoliatae E. & E., Bull. Torrey Club 22:58, 1895.
Dicaeoma pimpinellae (Str.) Kuntze, Rev. Gen. 3³:470, 1898; N. Am. Flora 7:396, 1920.

On Umbelliferae: 0, I, II, III. Autoecious.

Osmorrhiza brevipes (C. & R.) Suks. Seattle, June, 1892, E. W. D. Holway, Arth. Herb.; also April 8, 1910, T. C. Frye, Wash. Ured.

69; Bingen, June 5, 1894, W. N. Suksdorf 388, Wash. Ured. 638; Falcon Valley, Aug. 4, 1903, W. N. Suksdorf 1092, Wash. Ured. 789; Friday Harbor, June 14, 1909, T. C. Frye, Arth. Herb., Wash. Ured. 359; Winslow, June 5, 1919, Wash. Ured. 352; Marysville, Aug. 21, 1920, Wash. Ured. 175; Glacier, Aug. 27, 1920, F. Renner, Wash. Ured. 295; Langley, May 17, 1921, A. Reuter, Wash. Ured. 193.

Osmorrhiza divaricata Nutt. Bainbridge Island, July 28, 1909, E. Bartholomew, Barth. Fungi Columb. 3174, Barth. N. Am. Ured. 357, Arth. Herb.; Spokane, July 14, 1914, W. E. Flowers 6293, Wash. Ured. 2584; Locke, May 15, 1915, W. E. Flowers 6402, Wash. Ured. 1263.

Osmorrhiza intermedia (Rydb.) Blank. Spokane, Aug. 20, 1919, R. Posey and C. R. Stillinger, Arth. Herb., Wash. Ured. 801.

Osmorrhiza nuda Torr. Renton, Oct. 8, 1894, C. V. Piper 309, Arth. Herb.; Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, Arth. Herb.

144. Puccinia plumbaria Peck

Bot. Gaz. 6:228, 1881.
Aecidium giliae Peck, Bot. Gaz. 4:230, 1879.
Puccinia fragilis Tracey & Gall. Jour. Myc. 4:20, 1888.
Allodus giliae (Peck) Orton, Mem. N. Y. Bot. Gard. 6:199, 1916; N. Am. Flora 7:468, 1921.

On Polemoniaceae: 0, I, III. Autoecious.

Gilia capitata Hook. Bingen, May 14, 1894, W. N. Suksdorf 1073, Wash. Ured. 771.

Gilia gracilis (Dougl.) Hook. Husum, Apr. 30, 1884, W. N. Suksdorf 162, Wash. Ured. 532; Falcon Valley, June 24, 1893, W. N. Suksdorf 243, Wash. Ured. 568; Bingen, May 11, 1894, W. N. Suksdorf 984 (I), 985 (III), Wash. Ured. 746; Blue Mts., Columbia Co., Apr. 21, 1900, R. M. Horner 1443, Arth. Herb.; Seattle, 1906, Bonser 48, Arth. Herb.; Spokane, May 4, 1914, W. E. Flowers & J. R. Weir 14470, Arth. Herb.; Silverton, July 8, 1920, C. R. Stillinger 724, Wash. Ured. 829; Pullman, June 27, 1921, C. S. Parker, Herb. W.S.C. 781, Wash. Ured. 2781.

Gilia humilis (Greene) Piper. Indian Canyon, May 1, 1913, W. E. Flowers 6253, Wash. Ured. 1317; Locke, May 1, 1918, W. E. Flowers 6377, Wash. Ured. 1253; also Oct. 18, 1921, W. E. Flowers 6409, Wash. Ured. 1252; Kamiak Butte, May 24, 1921, C. S. Parker, Herb. W.S.C. 769, Wash. Ured. 2778.

This rust should not be confused with *P. giliae* Hark, which is also found in Washington and published under the name of *Dicaeoma giliae* in the N. Am. Flora (7:403, 1920). In this same publication *P.*

plumbaria Peck, an opsis form, is under the name *Allodus giliae* (7: 468, 1921).

145. Puccinia polygoni-amphibii Pers.

Syn. Fung. 227, 1801.
Aecidium geranii-maculati Schw. Schr. Nat. Ges. Leipzig 1:67, 1822.
Dicaeoma polygoni-amphibi (Pers.) Arth. Proc. Ind. Acad. Sci. 1898: 184, 1899; N. Am. Flora 7:381, 1920.

On Polygonaceae: II, III. Heteroecious. (0, I on Geraniaceae).

Polygonum amphibium L. Spokane, July 17, 1914, W. E. Flowers 6163, Wash. Ured. 2564.

Polygonum emersum (Mich.) Britt. Pullman, July 31, 1894, C. V. Piper 272, Wash. Ured. 1229; Davenport, Aug., 1919, J. R. Weir 11022, Arth. Herb.

Polygonum hartwrightii Gray. Bingen, Aug. 20, 1883, W. N. Suksdorf 127, Wash. Ured. 524; Pullman, July 31, 1894, C. V. Piper 272, Arth. Herb.; Bainbridge Is., Aug. 4, 1909, E. Bartholomew, Barth. Fungi Columb. 3176, Arth. Herb.; Seattle, Aug. 26, 1912, Mr. & Mrs. E. Bartholomew, Barth. N. Am. Ured. 961.

Polygonum sp. Bingen, Nov. 3, 1896, W. N. Suksdorf 987, Wash. Ured. 747.

146. Puccinia polygoni-vivipari H. Dietr.

P. Karst. Not. Sällsk. Faun. Fl. Fenn. 8:221, 1869.
Puccinia uniformis Pammel & Hume, Proc. Davenport Acad. 7:250, 1899.
Dicaeoma polygoni-vivipari (H. Dietr.) Arth. N. Am. Flora 7:382, 1920.

On Umbelliferae: 0, I, Heteroecious.

Ligusticum apiifolium (Nutt.) Gray. Mt. Rainier, Aug. 22, 1901, E. W. D. Holway, Arth. Herb.

On Polygonaceae: II, III.

Polygonum bistortoides Pursh. Mt. Rainier, Aug., 1895, C. V. Piper 484, Wash. Ured. 2917.

147. Puccinia porphyrogenita M. A. Curt.

Thüm. Myc. Univ. 545, 1876.
Puccinia acuminata Peck, Ann. Rep. N. Y. State Mus. 23:57, 1873. Not *P. acuminata* Fuckel, 1870.
Micropuccinia porphyrogenita (M. A. Curt.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:553, 1922.

On Cornaceae: 0, III.

Cornus canadensis L. Mt. Rainier, July 28, 1895, C. V. Piper 487, Arth. Herb., Wash. Ured. 2915; also Aug. 20, 1901, E. W. D. Holway, Arth. Herb.; Priest Lake, Sept., 1909, H. Martin, Wash. Ured. 88; Mt. Baker, Aug. 11, 1914, A. S. Hitchcock, Arth. Herb.; Locke, Aug. 10, 1915, W. E. Flowers 6003, Wash. Ured. 2502; Gla-

cier, July, 1918, H. Schmitz, Wash. Ured. 89; Cascade Mts., May 9, 1920, G. Howard, Wash. Ured. 157; Silverton, July 7, 1920, C. R. Stillinger and G. B. Posey 729, Wash. Ured. 834; Glacier, Aug. 27, 1920, F. R. Renner, Wash. Ured. 293.

148. Puccinia porri Wint.

Rab. Krypt. Fl. 1^1:200, 1881.
Uredo porri Sow. Engl. Fungi pl. 411, 1810.
Puccinia mixta Fuckel, Sym. Myc. 58, 1869.
Dicaeoma porri (Sow.) Kuntze Rev. Gen. 3^3:460, 1898; N. Am. Flora 7:374, 1920.

On Liliaceae: 0, I, II, III. Autoecious.

Allium schoenoprasum L. Seattle, June, 1923, C. R. Stillinger 1561, Wash. Ured. 1336.

149. Puccinia pulsatillae Klachbr.

Math. Term. Közlem. 3:307, 1865.
Puccinia trautvetteriae Syd. & Holw., Sydow Monog. Ured. 1:552, 1903.
Micropuccinia pulsatillae (Klachbr.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:527, 1922.

On Ranunculaceae: 0, III.

Trautvetteriae grandis Nutt. Chiquash Mts., Skamania Co., Sept. 2, 1893, W. N. Suskdorf 424; Olympic Mts., Aug., 1895, C. V. Piper 470, Herb. W.S.C.; Paradise Valley, Mt. Rainier (type locality), Aug. 24, 1901, E. W. D. Holway, Herb. W.S.C.

This species has been reported in the United States from only a few locations in the mountain regions of the Pacific Northwest. (See Holway's N. Am. Ured. 1:12, 1902).

150. Puccinia punctata Link

Ges. Nat. Freunde Berlin Mag. 7:30, 1815.
Puccinia galii Schw. Schr. Nat. Ges. Leipzig 1:73, 1822.
Puccinia galiorum Link, in Willd. Sp. Pl. 6^2:76, 1825.
Dicaeoma punctatum (Link) Arth. Proc. Ind. Acad. Sci. 1903; 150, 1904; N. Am. Flora 7:417, 1921.

On Rubiaceae: 0, I, II, III. Autoecious.

Galium aparine L. Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, Arth. Herb.; Hoquiam, July 2, 1920, C. R. Stillinger 759, Wash. Ured. 1089.

Galium asperrimum A. Gray. Pullman, Oct., 1893, C. V. Piper 141, Wash. Ured. 2890.

Galium triflorum Michx. Falcon Valley, Sept. 14, 1894, W. N. Suksdorf 383, Wash. Ured. 632; Bingen, Aug. 23, 1897, W. N. Suksdorf 1085, Wash. Ured. 782.

This species should not be confused with *P. ambigua* and *P. rubefaciens* occurring on the same host.

151. Puccinia ranunculi A. Blytt

Forh. Vid.-Selsk. Christ. 1882[5]:12, 1882.
Puccinia nuttallii Ellis & Ev., Bull. Torrey Club 24:283, 1897.
Micropuccinia ranunculi (A. Blytt) Arth. & Jackson, Bull. Torrey Club 48:42, 1921; N. Am. Flora 7:530, 1922.

On Ranunculaceae: 0, III.

Ranunculus suksdorfii Gray. Olympic Mts., Aug., 1895, C. V. Piper 457, Arth. Herb.

152. Puccinia rhaetica Ed. Fisch.

Bull. Herb. Boiss. 7:420, 1899.
Micropuccinia rhaetica (Ed. Fisch.) Arth. & &Jackson, N. Am. Flora 7:564, 1922.

On Scrophulariaceae: 0, III.

Veronica cusickii Gray. Mt. Rainier, Aug. 25, 1901, E. W. D. Holway; also Sept. 1, 1909, Arth. Herb.

153. Puccinia rhamni (Pers.) Wettst.

Verh. Zool.-Bot. Ges. Wien 35:545, 1886.
Aecidium rhamni Pers. in J. F. Gmel. Syst. Nat. 2:1472, 1791.
Puccinia coronata Corda, Ic. Fung. 1:6, 1837.
Aecidium allenii G. W. Clinton, Ann. Rep. N. Y. State Mus. 24:93, 1872.
Puccinia coronifera Kleb. Zeits. Pflanzenkr. 4:135, 1894.
Dicaeoma rhamni (Pers.) Kuntze, Rev. Gen. 3[3]:470, 1898; N. Am. Flora 7:313, 1920.

On Elaeagnaceae: 0, I. Heteroecious.

Lepargyrea canadensis (L.) Greene. Seattle, 1906, J. C. Hambleton, Arth. Herb.; Friday Harbor, June 20, 1909, T. C. Frye, Wash. Ured. 66; Locke, June 14, 1915, W. E. Flowers 6143, Wash. Ured. 2560; Chesaw, July 4, 1921, C. S. Parker, Herb. W.S.C. 873, Wash. Ured. 2794; Oak Harbor, May 24, 1922, H. N. Putnam, Wash. Ured. 956.

On Rhamnaceae: 0, I.

Rhamnus alnifolia L'Her. Spokane, June 8, 1914, W. E. Flowers 6170, Wash. Ured. 2566; Locke, June 14, 1916, W. E. Flowers 6171, Wash. Ured. 2567.

Rhamnus purshiana DC. Northwood Swamp, May 10, 1919, W. E. Muenscher, Arth. Herb.; Hoquiam, July 2, 1920, C. R. Stillinger 758, Wash. Ured. 1197; Silverton, July 5, 1920, C. R. Stillinger 732, Wash. Ured. 836; Charleston, May 22, 1921, G. Howard, Wash. Ured. 1196; Winslow, May 28, 1922, Wash. Ured. 963; Seattle, June 8, 1922, D. Mullen, Wash. Ured. 978.

On Poaceae: II, III.

Agrostis microphylla Steud. Bainbridge Is., Aug. 4, 1909, E. Bartholomew 4138, Arth. Herb.

Avena sativa L. Oak Harbor, Aug. 1, 1919, Wash. Ured. 1221; Bothell, Nov. 12, 1921, Wash. Ured. 355.

Calamagrostis aleutica Trin. Hoquiam, Sept., 1922, E. Bethel.

Calamagrostis canadensis (Michx.) Beauv. Hoquiam, July 2, 1920, C. R. Stillinger, Arth. Herb.

Cinna latifolia (Trev.) Griseb. Winslow, Oct. 10, 1921, Wash. Ured. 207.

Holcus lanatus L. Tacoma, Aug. 18, 1901, E. W. D. Holway 1005, Arth. Herb.; Olympia, June 15, 1919, F. D. Heald, Herb. W.S.C. 609; Winslow, Oct. 13, 1919, H. H. Hotson, Wash. Ured. 326; Hoquiam, July 2, 1920, C. R. Stillinger 711, Wash. Ured. 819; Seattle, Oct., 1920, L. Hartge, Wash. Ured. 190; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 270.

Lolium multiflorum Lam. Port Orchard, Aug., 1909, E. Bartholomew, Barth. Fungi Columb. 4466, Barth. N. Am. Ured. 1365, Arth. Herb.

Lolium perenne L. Rolling Bay, Oct. 9, 1921, Wash. Ured. 201; Winslow, Oct. 9, 1921, Wash. Ured. 202; Seattle, Nov. 15, 1921, Wash. Ured. 288.

Panicularia pauciflora (Presl.) Kuntze. Bothell, Aug. 28, 1909, E. Bartholomew 4200, Arth. Herb.; Bremerton, Aug. 1909, E. Bartholomew 4747, Arth. Herb.

This species is commonly known as "oat rust," although it is rarely found on this host in Washington. It is easily recognized by the coronate teliospore.

154. Puccinia ribis DC.

Fl. Fr. 2:221, 1805.
Puccinia pulchella Peck, Bull. Buffalo Soc. Nat. Sci. 1:66, 1873.
Micropuccinia ribis (DC.) Rostr. Plantep. Haandb. 266, 1902; N. Am. Flora 7:538, 1922.

On Saxifragaceae: 0, III.

Ribes triste Pall. Signal Peak Ranger Station, Yakima Co., July 28, 1922, L. N. Gooding and M. Noll, Arth. Herb., Wash. Ured. 999.

This species should not be confused with *P. grossulariae* or *P. parkerae*, also occurring on Ribes.

155. Puccinia rubefaciens Johans.

Bot. Notiser 1886:174, 1886.
Micropuccinia rubefaciens (Johans.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:568, 1922.

On Rubiaceae: 0, III.

Galium boreale L. Pullman, June, 1898, C. V. Piper 379, Arth. Herb., Wash. Ured. 1311; also June 28, 1916, B. F. Dana, Herb. W.

S.C. 314, Wash. Ured. 2750; Spokane, June 11, 1912, W. E. Flowers 6372, Wash. Ured. 1316; also July 4, 1914, W. E. Flowers 6204, Wash. Ured. 2522; Parker Lake, June 8, 1916, W. E. Flowers 6162, Wash. Ured. 1241; Fort George Wright, June 29, 1922, W. E. Flowers 6420, Wash. Ured. 1255.

There are three species of rusts found in Washington on Galium; *P. rubefaciens,* a micro-type; *P. ambigua,* an opsis-type, and *P. punctata* a eu-type.

156. Puccinia sauveolens Rostr.

Forh. Skand. Nat. 11:339, 1874.
Bullaria sauveolens (Pers.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:511, 1922.

On Compositae: 0, II, III.

Cirsium arvense (L.) Scop. Everett, July, 1919, A. Frank, Wash. Ured. 448; also July 4, 1923, Wash. Ured. 1820; Bothell, June 24, 1920, Wash. Ured. 1204; Seattle, July 4, 1920, Wash. Ured. 1205; Marysville, July 15, 1921, Wash. Ured. 1206; Tukwila, June 9, 1923, A. J. Seltzer, Wash. Ured. 1809.

157. Puccinia scandica Johans.

Bot. Notiser 1886:175, 1886.
Micropuccinia scandica (Johans.) Arth. & Jackson, Bull. Torrey Club 48: 41, 1921; N. Am. Flora 7:550, 1922.

On Onagraceae: 0, III.

Epilobium clavatum Trel. Mt. Adams, Oct. 1, 1904, W. N. Suksdorf 981, Wash. Ured. 744.

158. Puccinia sherardiana Körn.

Hedwigia 16:19, 1877.
Puccinia malvastri Peck, Bull. Torrey Club 12:35, 1885.
Pucicnia sphaeralceae Ellis & Ev., Am. Nat. 31:428, 1897.
Micropuccinia sherardiana (Körn) Arth. & Jackson, Bull. Torrey Club 48: 41, 1921; N. Am. Flora 7:543, 1922.

On Malvaceae: 0, III.

Malvastrum coccineum (Pursh) Gray. Yakima, June 16, 1915, F. D. Heald, Herb. W.S.C. 42, Wash. Ured. 2708.

Sidalcea oregana (Nutt.) Gray. Pullman, July 2, 1898, C. V. Piper 397, Arth. Herb., Wash. Ured. 2926; Spokane, June 10, 1912, W. E. Flowers 6337, Wash. Ured. 2599.

Sidalcea sp. Pullman, June 28, 1916, B. F. Dana, Herb. W.S.C. 309, Wash. Ured. 2747.

Sphaeralcea munroana (Dougl.) Spach. Yakima, Aug. 3, 1894, C. V. Piper 293, Arth. Herb., Wash. Ured. 2907.

159. Puccinia stipae Arth.

Bull. Iowa Agr. Coll. Dept. Bot. 1884:160, 1884.
Dicaeoma stipae (Arth.) Kuntze, Rev. Gen. 3³:470, 1898; N. Am. Flora 7:300, 1920.

On COMPOSITAE: 0, I. Heteroecious.

Chrysothamus graveolens (Nutt.) Greene. Locke, July 10, 1917, W. E. Flowers 6026, Wash. Ured. 2524.

On POACEAE: II, III.

Stipa comata Trin. & Rupr. Pullman, May 5, 1921, G. L. Zundel, Herb. W.S.C. 784, Wash. Ured. 1279.

160. Puccinia subangulata Holw.

N. Am. Ured. 1:25, 1905.
Allodus subangulata (Holw.) Orton, Mem. N. Y. Bot. Gard. 6:183, 1916; N. Am. Flora 7:456, 1921.

On LILIACEAE: 0, I, III. Autoecious.

Hookera pulchella Salisb. Bingen (type locality), May 3, 1899, W. N. Suksdorf, Arth. Herb.; also Apr. 15, 1904, W. N. Suksdorf 972, Wash. Ured. 737.

161. Puccinia subcircinata Ellis & Ev.

Jour. Myc. 3:56, 1887.
Allodus subcircinata (E. & E.) Arth. Result. Sci. Congr. Vienne 345:1906; N. An. Flora 7:477, 1921.

On COMPOSITAE: 0, I, III. Autoecious.

Senecio atriapiculatus Rydb. Wawawai, Apr. 26, 1902, C. V. Piper 820, Arth. Herb.

Senecio hydrophilus Nutt. Falcon Valley, July 17, 1896, W. N. Suksdorf 530, Arth. Herb.

Senecio triangularis Hook. Mt. Adams, Aug., 1885, W. N. Suksdorf, Arth. Herb., Ellis & Ev. N. Am. Fungi 1840.

162. Puccinia subnitens Diet.

Erythea 3:81, 1895.
Aecidium sarcobati Peck, Bot. Gaz. 6:240, 1881.
Dicaeoma sarcobati (Peck) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:305, 1920.

On CHENOPODIACEAE: 0, I. Heteroecious.

Sarcobatus vermiculatus (Hook.) Torr. Yakima Co., May 28, 1892, L. F. Henderson, Arth. Herb.; Walla Walla, July 25, 1915, W. E. Flowers 6052, Wash. Ured. 2538.

Spinacia oleracea Mill. Walla Walla, May 20, 1922, C. L. Robinson, Wash. Ured. 976; also F. D. Heald, Herb. W.S.C. 1015, Wash. Ured. 2810.

On Poaceae: II, III.

Distichlis spicata (L.) Greene. Yakima, July 10, 1915, Arth. Herb., Wash. Ured. 110; Touchet, July 15, 1920, F. George, Wash. Ured. 120; Walla Walla, May 20, 1922, F. D. Heald, Herb. W.S.C. 1017, Wash. Ured. 2811.

This species is morphologically indistinguishable from *Uromyces peckianus* Farl. except that it has two-celled teliospores. The latter, however, is found almost exclusively in salt marshes around Puget Sound and along the coast, while *P. subnitens* is found mostly in the interior.

163. Puccinia suksdorfii Ellis & Ev.

Jour. Myc. 7:130, 1892.
Micropuccinia suksdorfii (Ellis & Ev.) Arth. & Jackson, Bull. Torrey Club 48:41, 1921; N. Am. Flora 7:585, 1922.

On Compositae: 0, III.

Agoseris glauca (Nutt.) Geeene. Spangle (type locality), May 24, 1901, C. V. Piper 756, Arth. Herb.

164. Puccinia symphoricarpi Hark.

Bull. Calif. Acad. 1:35, 1884.
Micropuccinia symphoricarpi (Hark.) Arth. & Jackson, N. Am. Flora 7:570, 1922.

On Caprifoliaceae: 0, III.

Symphoricarpos albus (L.) Blake. Klickitat Co., Sept., 1884, W. Suksdorf 170, Barth. N. Am. Ured. 574, Wash. Ured. 538; Spokane, July 4, 1914, W. E. Flowers 6010, Wash. Ured. 2509; Locke, June 12, 1915, W. E. Flowers 6160, Wash. Ured. 2562; Seattle, June 14, 1920, G. Howard, Wash. Ured. 160; Sol Duc Hot Springs, July 14, 1920, J. S. Boyce, Wash. Ured. 2861.

Symphoricarpos sp. Chiquash Mts., Aug. 19, 1892, W. N. Suksdorf 1070, Wash. Ured. 768.

This micro-form should not be confused with *P. abundans*, a heteroecious eu-type having pycnia and aecia on the same host.

165. Puccinia taraxaci (Reb.) Plowr.

Brit. Ured. & Ustil. 186, 1889.
Puccinia phaseoli var. *taraxaci* Reb. Prodr. Fl. Noem. 356, 1804.
Bullaria hieracii (Schum.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:513, 1922.

On Compositae: 0, II, III.

Taraxacum taraxacum (L.) Karst. Bingen, July 27, 1893, W. N. Suksdorf 245, Wash. Ured. 570; Sumner, Sept., 1898, C. V. Piper, Arth. Herb.; Poulsbo, Aug. 9, 1909, E. Bartholomew, Barth. Fungi

Columb. 3178, Arth. Herb.; Wenatchee, July 15, 1912, E. Bartholomew, Barth. N. Am. Ured. 868; Spokane, Sept. 2, 1914, W. E. Flowers 6039, Wash. Ured. 2536; Sunnyside, Aug. 21, 1915, F. D. Heald, Herb. W.S.C. 227, Wash. Ured. 2738; Seattle, Sept. 15, 1917, Wash. Ured. 80; Puyallup, Oct. 5, 1917, A. Frank, Wash. Ured. 453; Yarrow, Feb. 29, 1920, G. Howard, Wash. Ured. 156; Hartford, July 9, 1920, C. R. Stillinger 743, Wash. Ured. 846; Kirkland, July 10, 1920, C. R. Stillinger 703, Wash. Ured. 811; Glacier, Aug. 27, 1920, F. R. Renner, Wash. Ured. 294; Pullman, Sept. 20, 1920, F. D. Heald, Herb. W.S.C. 744, Wash. Ured. 2769; Port Townsend, June 22, 1922, Wash. Ured. 983; Nisqually Flats, July 25, 1922, Wash. Ured. 1198.

This species is morphologically indistinguishable from *P. hieracii* but when transferred from *Taraxacum* to the hosts of the latter they fail to produce infection. In the N. Am. Flora these two species are treated as synonyms.

166. Puccinia treleasiana Paz.

Rab.-Wint.-Paz. Fungi Eur. 3821 (Hedwigia 31:317), 1892.
Micropuccinia treleasiana (Paz.) Arth. & Jackson, N. Am. Flora 7:529, 1922.

On RANUNCULACEAE: 0, III.

Caltha biflora DC. Skagit Pass, Cascade Mts., Aug., 1892, E. R. Lake and W. R. Hull, Arth. Herb.

167. Puccinia triticina Erikss.

Ann. Sci. Nat. VIII, 9:270, 1899.
Dicaeoma clematidis (DC.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:333, 1920.

On POACEAE: II, III. Heteroecious. (0, I on Ranunculaceae).

Triticum vulgare L. Manette, Aug. 17, 1912, E. Bartholomew, Barth. N. Am. Ured. 1178, Arth. Herb.; Yakima, July 7, 1915, F. D. Heald, Herb. W.S.C. 136, Wash. Ured. 2722; Pullman, July 23, 1915, C. Sax, Herb. W.S.C. 161, Wash. Ured. 2727; Winslow, July 4, 1918, Wash. Ured. 353; Puyallup, July 10, 1918, A. Frank, Wash. Ured. 429; Lind, July 1, 1919, Wash. Ured. 136; Waitsburg, July, 1919, Wash. Ured. 148; Dayton, July, 1919, Wash. Ured. 145; Walla Walla, July, 1919, Wash. Ured. 149; St. John, Aug., 1919, Wash. Ured. 319; Washtucna, Aug., 1919, Wash. Ured. 318; Coupeville, Aug. 2, 1919, Wash. Ured. 314; Garfield, Aug., 1919, Wash. Ured. 320; Oakesdale, Aug., 1919, Wash. Ured. 317; Oak Harbor, Aug. 1, 1919, Wash. Ured. 354; Everett, Aug. 28, 1919, A. Frank, Wash. Ured. 442; Uniontown, Sept. 7, 1919, B. F. Dana, Herb. W.S.C.

681, Wash. Ured. 276; Seattle, Sept. 10, 1919, Wash. Ured. 322; Langley, June, 1922, A. Reuter, Wash. Ured. 988.

This common leaf rust of wheat is morphologically indistinguishable from *P. clematidis* where it is placed in the N. Am. Flora 7:333, 1920. It seems best for the purposes of this article to list the collections on wheat separately as above.

168. Puccinia troglodytes Lindr.

Medd. Stockh. Högsk. Bot. Inst. 4°:6, 1901.
Dicaeoma troglodytes (Lindr.) Jackson, Proc. Ind. Acad. Sci. 1915:461, 1916; N. Am. Flora 7:418, 1921.

On Rubiaceae: II, III. Heteroecious. (0, I unknown).

Galium triflorum Michx. Seattle, Sept., 1892, C. V. Piper 61, Arth. Herb.

169. Puccinia urticae (Schum.) Lagerh.

Mitt. Bad. Bot. Ver. 2:72, 1889. (Not *P. urticae* Barclay, 1888).
Aecidium urticae Schum. Enum. Pl. Saell. 2:222, 1803.
Caeoma urticatum Link, in Willd. Sp. Pl. 6²:62, 1825.
Dicaeoma urticae (Schum.) Kuntze, Rev. Gen. 3³:467, 1898; N. Am. Flora 7:358, 1920.
Puccinia garrettii Arth. Bull. Torrey Club 32:41, 1905.
Puccinia urticata Kern. Mycol. 9:214, 1917.

On Urticaceae: 0, I. Heteroecious.

Urtica lyallii Wats. Spokane, May 30, 1913, W. E. Flowers 6037, Wash. Ured. 2534; Puyallup, June 3, 1919, A. Frank, Wash. Ured. 421; Ft. Lawton, May, 1922, L. Sundquist, Wash. Ured. 965; Winslow, June 9, 1022, Wash. Ured. 1199.

On Cyperaceae: II, III.

Carex amplifolia Boott. Spokane, June 1, 1892, L. F. Henderson, Arth. Herb.

Carex cryptocarpa Mey. Chelan, Aug., 1916, J. R. Weir 11226, Arth. Herb.;Winslow, Oct. 5, 1922, Wash. Ured. 1220.

Carex kelloggii Booth. Spokane, Sept. 7, 1912, W. E. Flowers 6125, Wash. Ured. 2556.

Carex magnifica Dewey. Bothell, Aug. 28, 1921, E. Bartholomew. Barth. Fungi Columb. 3170, Arth. Herb.

Carex mertensii Pres. Silverton, July 8, 1920, C. R. Stillinger 754, Arth. Herb., Wash. Ured. 1084; Barlow Pass, Aug. 6, 1920, F. Renner, Arth. Herb.

Carex nebraskensis Dewey. Oakedale, July 20, 1919, Wash. Ured. 139.

Carex rostrata Stokes. Falcon Valley, Sept. 2, 1886, W. N. Suks-

dorf 313, Wash. Ured. 589; Bainbridge Is., Aug. 4, 1909, Mrs. C. R. Ingle, Arth. Herb.

Carex utriculata Boott. Bainbridge Is., Aug. 4, 1909, Mrs. C. R. Ingle, Arth. Herb.

Carex sp. Pullman, Oct. 23, 1916, F. D. Heald and D. C. George, Herb. W.S.C. 449.

This species is similar to *P. grossulariae* Lagerh. except that the aecial host is different.

170. Puccinia veratri Duby

Bot. Gall. 2:890, 1830.
Uredo veratri DC., Poir. in Lam. Encyc. 8:224, 1808.
Puccinia veratri Niessl. Verh. Zool.-Bot.-Ges. Wien. 9:177, 1859.
Puccinia veratri Clinton, Rep. N. Y. State Mus. 27:103, 1875.
Dicaeoma veratri (DC.) Kuntze, Rev. Gen. 3³:471, 1898; N. Am. Flora 7:371, 1920.

On ONAGRACEAE: 0, I. Heteroecious.

Epilobium paniculatum Nutt. Falcon Valley, June 23, 1893, W. N. Suksdorf, Barth. N. Am. Ured. 436, Arth. Herb.

On LILIACEAE: II, III.

Veratrum californicum Durand. Falcon Valley, June 28, 1883, W. N. Suksdorf 72, Barth. N. Am. Ured. 577, Wash. Ured. 519; Port Orchard, June 9, 1923, A. J. Seltzer, Wash. Ured. 1807.

Veratrum speciosum Rydb. Seattle, July 4, 1897, C. V. Piper 410, Arth. Herb.

171. Puccinia violae (Schum.) DC.

Fl. Fr. 6:62, 1815.
Aecidium violae Schum. Enum. Pl. Saell, 2:224, 1803.
Puccinia densa Diet. & Holw., Hedwigia 36:298, 1897.
Dicaeoma violae (Schum.) Kuntze, Rev. Gen. 3³:471, 1898; N. Am. Flora 7:392, 1920.

On VIOLACEAE: 0, I, II, III. Autoecious.

Viola adunca Smith. Bingen, Apr. 8, 1885, W. N. Suksdorf 180, Wash. Ured. 546; Elma, July 19, 1898, A. A. Heller, Plants of Wash. 4066, Arth. Herb.; Pullman, June 23, 1892, W. R. Hull 176, Herb. W.S.C.; Hillyard, May 10, 1914, W. E. Flowers 6225, Wash. Ured. 2576.

Viola canadensis L. Locke, Aug. 14, 1917, W. E. Flowers 6032, Wash. Ured. 2530.

Viola glabella Nutt. Falcon Valley, July 31, 1885, W. N. Suksdorf 203, Ellis N. Am. Ured. 672, Arth. Herb., Wash. Ured. 553; Husum, May 13, 1895, W. N. Suksdorf 459, Wash. Ured. 672; Olympic Mts., Aug., 1895, C. V. Piper 458, Herb. W.S.C.; Chiquash

Mts., Skamania Co., Aug. 28, 1895, W. N. Suksdorf 460, Wash. Ured. 673; Bingen, July 19, 1897, W. N. Suksdorf 544, Ellis N. Am. Ured. 1574, Wash. Ured. 690; Mt. Rainier, Aug. 27, 1901, E. W. D. Holway, N. Am. Ured. 1478; Bellingham, June, 1913, J. R. Weir 13. Arth. Herb.; Prindle, May 26, 1924, W. N. Suksdorf 1103, Wash. Ured. 1343.

Viola howellii Gray. Puyallup, May 26, 1921, A. Frank, Wash. Ured. 406; Rochester, July 26, 1921, A. Frank, Wash. Ured. 444.

Viola macloskeyi Lloyd. Silverton, July 8, 1920, G. B. Posey and C. R. Stillinger 721, Wash. Ured. 826.

Viola montanensis Rydb. Montesano, 1898, A. A. Heller 4066, Arth. Herb.

Viola nephrophylla Greene. Adams Co., Aug., 1893, C. V. Piper 604, Herb. W.S.C.; Yakima, Sept. 7, 1894, C. V. Piper 608, Arth. Herb.

Viola nuttallii Pursh. Falcon Valley, May 19, 1897, W. N. Suksdorf 839, Wash. Ured. 685; Spokane, May 10, 1914, W. E. Flowers 6034, Wash. Ured. 2531.

Viola palustris L. Longmire Spring, Mt. Rainier, Aug. 20, 1901, E. W. D. Holway, Arth. Herb.

172. Puccinia wulfeniae Diet. & Holw.

Erythea 3:79, 1895.
Puccinia synthyridis Ell. & Ev. Bull. Torrey Club 27:61, 1900.
Micropuccinia wulfeniae (Diet. & Holw.) Arthur & Jackson, N. Am. Flora 7:567, 1922.

On Scrophulariaceae: 0, III.

Synthyris rubra (Dougl.) Benth. Pullman, June 28, 1898, C. V. Piper 390, Herb. W.S.C., Wash. Ured. 1307.

Synthyris rotundifolia Gray. Vancouver, June 8, 1904, C. V. Piper, Herb. W.S.C.

173. Puccinia xanthii Schw.

Schr. Nat. Ges. Leipzig 1:73, 1822.
Micropuccinia xanthii (Schw.) Arth. & Jackson, Bull. Torrey Club 48:42, 1921; N. Am. Flora 7:571, 1922.

On Compositae: 0, III.

Ambrosia trifida L. Spokane, Sept. 9, 1907, W. E. Flowers 6035, Wash. Ured. 2532.

Xanthium speciosum Kear. Clarkston, Aug. 14, 1915, F. D. Heald & D. C. George, Herb. W.S.C. 194, Wash. Ured. 2733.

Xanthium spinosum L. Spokane, July 21, 1907, W. E. Flowers 6336, Wash. Ured. 2598.

Xanthium varians Greene. Dayton, July 21, 1919, Wash. Ured. 142; Waitsburg, July 22, 1919, Arth. Herb., Wash. Ured. 141; also Aug. 11, 1899, R. M. Horner 1246, Herb. W.S.C.

174. Puccinia ziziae Ellis & Ev.

Bull. Torrey Club 22:60, 1895.
Bullaria ziziae (Ellis & Ev.) Arth. Result. Sci. Congr. Bot. Vienne 346, 1906; N. Am. Flora 7:489, 1922.

On Umbelliferae: 0, II, III.

Zizia cordata Koch. Pullman, Sept. 24, 1893, C. V. Piper 164, Arth. Herb., Herb. W.S.C. (type location).

Uromyces Link

175. Uromyces abbreviatus Arth.

Bull. Torrey Club 42:587, 1915.
Teleutospora abbreviata (Arth.) Arthur & Bisby, N. Am. Flora 7:517, 1922.

On Leguminosae: 0, III.

Psoralea physodes Dougl. Bremerton, July 22, 1912, E. Bartholomew 4752, Arth. Herb., Barth. N. Am. Ured. 7582, Barth. Fungi Columb. 4884.

This species seems to be closely related to *U. psoraleae* Peck (0, I, III); the telia of the two species being morphologically indistinguishable. Both species are found in Washington.

176. Uromyces amoenus Sydow

Ann. Myc. 4:28, 1906.
Teleutospora amoena (Sydow) Arth. & Bisby, N. Am. Flora 7:519, 1922.

On Compositae: 0, III.

Anaphalis margaritacea occidentalis Greene. Paradise Valley, Mt. Rainier, Aug. 20, 1901, E. W. D. Holway 1008, N. Am. Ured. 1584; Chiquash Mt., Skamania Co., Sept. 9, 1902, W. N. Suksdorf 788 Arth. Herb., Wash. Ured. 722; Spokane, Oct. 4, 1920, C. R. Stillinger 578, Wash. Ured. 805.

177. Uromyces brodiaeae Ell. & Hark.

Bull. Calif. Acad. 1:28, 1884.
Aecidium brodiaeae Ellis & Hark. Bull. Calif. Acad. 1:28, 1884.
Uromycopsis brodiaeae Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Pucciniola brodiaeae (Ellis & Hark.) Arth. N. Am. Flora 7:441, 1921.

On Liliaceae: 0, I, III. Autoecious.

Hookera hyacinthina (Lindl.) Kuntze. Bingen, Apr. 16, 1900, W. N. Suksdorf 982, Wash. Ured. 745. (This specimen has telia only).

Recently it has been shown that the aecia commonly occurring on Hookera and considered part of the life cycle of *U. brodiaeae* is in reality the aecial stage of *P. pattersoniana* (Cf. 140).

178. Uromyces caladii (Schw.) Farl.

Ellis, N. Am. Fungi 232, 1879.
Aecidium caladii Schw., Schr. Nat. Ges. Leipzig 1:69, 1822
Uromyces peltandrae Howe, Bull. Torrey Club 5:3, 1874.
Uromyces arisaemae Cooke, Bull. Torrey Club 6:32, 1875.
Nigredo caladii (Schw.) Arth. Result. Sci. Congr. Bot. Vienne 343, 1906; N. Am. Flora 7:236, 1912.

On Araceae: 0, I, II, III. Autoecious.

Arisaema triphyllum (L.) Schott. Seattle, in the green house of the Univ. of Wash., Apr. 10, 1925, Wash. Ured. 1362.

This host is not a native of the state of Washington but has been introduced from the eastern states and probably the rust with it.

179. Uromyces caryophyllinus (Schrank) Wint.

in Rab. Krypt. Fl. 1^1:149, 1881.
Lycoperdon caryophyllinum Schrank, Baier. Fl. 2:688, 1789.
Uromyces dianthi Niessl, Verh. Nat. Ver. Brünn 10^2:162, 1872.
Nigredo caryophyllina (Schrank) Arth. N. Am. Flora 7:246, 1912.

On Caryophyllaceae: II, III. (0, I on Euphorbiaceae).

Dianthus caryophyllus L. Pullman, Feb., 1919, N. F. Thompson, Wash. Ured. 131, Yakima, April 28, 1921, G. B. Rigg, Wash. Ured. 215; Seattle, Nov. 10, 1921, Wash. Ured. 1098; Bothell, Nov. 12, 1921, Wash. Ured. 254; Spokane, Jun. 17, 1922, W. E. Flowers 6358, Wash. Ured. 1102.

The uredinia and telia of this rust are found on certain cultivated varieties of *Dianthus caryophyllus,* especially in greenhouses, where considerable loss to florists sometimes occurs. It came originally from Europe but introduced into Washington from the eastern states or from California.

180. Uromyces dictyosperma Ellis & Ev.

N. Am. Fungi 2882, hyponym, 1893; Ann. Myc. 8:12, 1910; not yet published in N. Am. Flora.

On Euphorbiaceae: II, III, Heteroecious. (0, I unknown).

Euphorbia dictyosperma F. & M. Bingen, May 20, 1908, W. N. Suksdorf 1061, Wash. Ured. 759.

181. Uromyces fabae (Pers.) DeBary

Ann. Sci. Nat. IV, 20:80, 1863.
Uredo fabae Pers. Neues Mag. Bot. 1:93, 1794.
Uromyces polymorphus Peck & Clinton, Ann. Rep. N. Y. State Mus. 31:43, 1879.
Nigredo fabae (Pers.) Arth. N. Am. Flora 7:251, 1912.

On LEGUMINOSAE: 0, I ,II, III. Autoecious.

Lathyrus bijugatus sandbergii White. Mt. Adams, Skamania Co, Aug. 8, 1886, W. N. Suksdorf 323, Arth. Herb., Wash. Ured. 598; Pullman, June 2, 1894, C. V. Piper 263, Wash. Ured. 2895; also June 18, 1921, C. S. Parker, Herb. W.S.C. 791, Wash. Ured. 2784.

Lathyrus obovatus (Torr.) White. Locke, Aug. 14, 1917, W. E. Flowers 6395, Wash. Ured. 1144.

Lathyrus palustris L. Skamania Co., Aug. 8, 1886, W. N. Suksdorf, Barth. N. Am. Ured. 684, Arth. Herb.; Winslow, June 10, 1919, Wash. Ured. 1329; Friday Harbor, July, 1919, G. Howard, Wash. Ured. 1328.

Lathyrus pauciflorus Fernald. Snake River, Whitman Co., July, 1898, C. V. Piper, Wash. Ured. 2929; Adna, Aug. 3, 1922, Wash. Ured. 1017; Napavine, Aug. 3, 1922, Wash. Ured. 1015; Winlock, Aug. 3, 1922, Wash. Ured. 1014; Chehalis, August 4, 1922, Wash. Ured. 1018; Castle Rock, Aug. 18, 1922, Wash. Ured. 1022.

Lathyrus polyphyllus Nutt. Olympia, June 28, 1920, C. R. Stillinger 708, Wash. Ured. 816.

Lathyrus sulphureus Brewer. Bainbridge Island, July 27, 1912, E. Bartholomew, Barth. N. Am. Ured. 886, Barth. Fungi Columb. 3194, Arth. Herb.

Vicia americana Muhl. Falcon Valley, June 1. 1883, W. N. Suksdorf 58 (Ellis N. Am. Fungi 1431 under *Aecidium album* Clinton), Wash. Ured. 512; Pullman, C. V. Piper 592, Arth. Herb.; Wenatchee, July 15, 1912, E. Bartholomew, Barth. Fungi Columb. 4494, Arth. Herb.; Spokane, Aug. 15, 1919, J. R. Weir 14425, Arth. Herb.; Kirkland, July 10, 1920, G. B. Posey and C. R. Stillinger 706, Wash. Ured. 814; Winslow, July 12, 1920, Wash. Ured. 155; Puyallup, July 17, 1921, A. Frank 129, Wash. Ured. 410.

182. Uromyces fallens (Desmaz.) Kern

Phytopathology 1:6, 1911.
Uredo fallens Desmaz. Pl. Crypt. 1325, 1843.
Nigredo fallens (Desmaz.) Arthur, N. Am. Flora 7:254, 1912.

On LEGUMINOSAE: 0, I, II, II. Autoecious.

Trifolium pratense L. Yakima, Aug., 1914, Wash. Ured. 90; Wenatchee, July 29, 1915, D. C. George, Herb. W.S.C. 165, Wash. Ured. 2728; Kennewick, Aug. 18, 1915, F. D. Heald, Herb. W.S.C. 209, Wash. Ured. 2735; Pullman, Oct. 26, 1920, F. D. Heald, Herb. W.S.C. 749, Wash. Ured. 2771; Rolling Bay, Oct. 30, 1921, Wash. Ured. 217; Houghton, Nov. 12, 1921, Wash. Ured. 233; Medina, Nov. 12, 1921, Wash. Ured. 234; Bothell, Nov. 12, 1921, Wash. Ured. 258;

Aberdeen, Oct., 922, E. Bethel, Wash. Ured. 1077; Port Townsend, June 22, 1922, Wash. Ured. 982; Winslow, Oct. 28, 1922, Wash. Ured. 1074.

In a letter from Mr. E. Bethel he reports finding *Uromyces fallens* at Montesano, Oakville, Elma, Washkah, Ocosta, Cosmopolis, and Hoquiam during October, 1922.

This is the common rust on red clover. The aecia are rarely seen but probably are not uncommon. It is distinguished from another autoecious form, *U. trifolii* occurring on white clover, by the character of the urediniospore pores which are 3-6, scattered, in an occasional spore, equatorial. In the latter species the urediniospore pores are 3 or 4 equatorial.

183. Uromyces gentianae Arth.

Bot. Gaz. 16:227, 1891.
Nigredo gentianae Arth. N. Am. Flora 7:264, 1912.

On Gentianaceae: II, III. (0, I unknown).

Gentiana acuta Michx. Mt. Adams, Aug. 1, 1890, W. N. Suksdorf 358, Arth. Herb., Wash. Ured. 620.

184. Uromyces glycyrrhizae (Rab.) Magn.

Ber. Deuts. Bot. Ges. 8:383, 1890.
Uredo leguminosarum glycyrrhizae Rab. Flora 33:626, 1850.
Caeomurus glycyrrhizae Kuntze, Rev. Gen. 3³:450, 1898.
Klebahnia glycyrrhizae (Rab.) Arth. Result. Sci. Congr. Bot. Vienne 345, 1906; N. Am. Flora 7:478, 1921.

On Leguminosae: 0, II, III. Autoecious.

Glycyrrhiza lepidota Nutt. Columbus, June 11, 1886, W. N. Suksdorf 235, Wash. Ured. 562; Bingen, Nov. 14, 1894, W. N. Suksdorf 454, Arth. Herb., Wash. Ured. 667; Wawawai, July 31, 1893, C. V. Piper 118, Wash. Ured. 2884; Latch Creek, July 4, 1914, W. E. Flowers 6047, Wash. Ured. 1099; Washtucna, July, 1919, Wash. Ured. 198; Snake River, Asotin Co., Sept. 26, 1922, C. S. Parker, Herb. W. S.C. 1044, Wash. Ured. 2813.

185. Uromyces hedysari-obscuri (DC.) Carest. & Picc.

Erb. Critt. Ital. II:447, 1871.
Uromyces borealis Peck, Bot. Gaz. 6:276, 1881.
Uromycopsis hedysari-obscuri Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Puccinia hedysari-obscuri (DC.) Arthur, N. Am. Flora 7:450, 1921.

On Leguminosae: 0, I, III. Autoecious.

Hedysarum occidentale Greene. Olympic Mts., Aug., 1895, C. V. Piper 472, Wash. Ured. 1210; Locke, Sept. 13, 1915, W. E. Flowers 6363, Wash. Ured. 1185.

186. Uromyces heterodermus Sydow

Ann. Myc. 4:29, 1906.
Teleutospora heteroderma (Sydow) Arth. & Bisby, N. Am. Flora 7:516, 1922.

On Liliaceae: 0, III.

Erythronium giganteum Lindl. Lake Sawyer, April 30, 1923, Paul Bargeth, Wash. Ured. 1802; Port Orchard, April 8, 1924, A. N. Carlson, Wash. Ured. 1327.

Erythronium grandiflorum Pursh. Falcon Valley, May 19, 1884, W. N. Suksdorf 166, Arth. Herb., Wash. Ured. 353; Paradise Valley, Mt. Rainier, Aug. 20, 1901, E. W. D. Holway; Bingen, May 7, 1902, W. N. Suksdorf 1089; Locke, June 1, 1916, W. E. Flowers 6166, Wash. Ured. 1104; Kamiak Butte, May 24, 1921, C. P. Parker, Herb. W.S.C. 770, Wash. Ured. 2779.

Erythronium montanum Wats. Cascade Mts., Skamania Co, Aug. 26, 1895, W. N. Suksdorf 462, Barth. N. Am. Ured. 789, Arth. Herb., Wash. Ured. 675; Mt. Rainier, Aug., 1895, C. V. Piper, Arth. Herb.

Erythronium parviflorum (Wats.) Goodding. Locke, June 22, 1917, W. E. Flowers 6049, Wash. Ured. 1105.

187. Uromyces lilii G. W. Clinton

Ann. Rep. N. Y. State Mus. 27:103, 1875.
Uromyces holwayi Lagerh., Hedwigia 28:108, 1889.
Nigredo lilii (G. W. Clinton) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:242, 1912.

On Liliaceae: 0, I, II, III. Autoecious.

Lilium columbianum Hanson. Skamania Co., Sept. 1, 1898, W. N. Suksdorf 546, Arth. Herb., Wash. Ured. 692; Seattle, June 2, 1892, C. V. Piper 58, Arth. Herb.; Bingen, May 27, 1902, W. N. Suksdorf 798, Arth. Herb.; Spokane, Sept., 1915, J. R. Weir 93, Arth. Herb.; Bellingham, Sept., 1918, D. Griffiths, Arth. Herb.; Port Orchard, June 9, 1923, A. J. Seltzer, Wash. Ured. 1806.

188. Uromyces intricatus Cooke

Grevillea 7:3, 1878.
Uromyces eriogoni Ellis & Hark., Bull. Calif. Acad. 1:29, 1884.
Uromyces gnaphalii Ellis & Ev. Erythea 1:204, 1893.
Nigredo intricata (Cooke) Arth. N. Am. Flora 7:244, 1912.

On Polygonaceae: 0, I, II, III. Autoecious.

Eriogonum compositum Dougl. Bingen, June 24, 1886, W. N. Suksdorf 325, Arth. Herb., Wash. Ured. 601; Wawawai, July 31, 1893, C. V. Piper 119, Wash. Ured. 2885; Goldendale, Sept. 1, 1915, E. Bartholomew, Barth. N. Am. Ured. 1696, Arth. Herb.

Eriogonum effusum Nutt. Spokane, Sept. 12, 1915, W. E. Flowers 6048, Wash. Ured 1142.

Eriogonum heracleoides Nutt. Pullman, July 31, 1894, C. V. Piper 275, Arth. Herb., Wash. Ured. 2906.

Eriogonum niveum Dougl. Wawawai, June 16, 1892, E. R. Lake, Arth. Herb.

Eriogonum umbellatum Torr. Mt. Adams, June 14, 1890, W. N. Suksdorf 359, Wash. Ured. 621; Spokane, July 14, 1907, W. E. Flowers 6101, Wash. Ured. 1141.

Eriogonum vimineum Dougl. Bingen, July 5, 1905, W. N. Suksdorf 993, Wash. Ured. 751.

189. Uromyces jacksonii Arth. & Fromme

Torreya 15:260, 1915.

On Poaceae: II, III. Heteroecious. (0, I unknown).

Deschampsia elongata (Hook.) Munro. Bremerton, July 20, 1912, E. Bartholomew, Barth. Fungi Columb. 4460, N. Am. Ured. 1237, Arth. Herb., Wash. Ured. 1305.

Hordeum nodosum L. Port Orchard, Aug. 1, 1912. E. Bartholomew, Barth. Fungi Columb. 4495, Arth. Herb.

190. Uromyces junci (Desmaz) L.

Tul. Ann. Sci. Nat. IV-2:146, 1854.
Puccinia junci Desmaz Pl. Crypt. 81:1825.
Nigredo junci (Desmaz) Arthur, N. Am. Flora 7:238, 1912.

On Juncaceae: II, III. Heteroecious. (0, I on Compositae).

Juncus balticus Willd. Falcon Valley, W. N. Suksdorf 1086, Sept. 28, 1898, Wash. Ured. 783; Pullman, Nov. 10, 1898, C. V. Piper 597, Wash. Ured. 2931; Ilwaco, Sept., 1922, E. Bethel.

Juncus suksdorfii Rydb. Falcon Valley, Sept. 2, 1886, W. N. Suksdorf 314, Wash. Ured. 590.

Juncus torreyi Cov. Ilwaco, Sept., 1922, E. Bethel.

Juncus sp. Houghton, Nov. 12, 1921, Wash. Ured. 268; Spokane, Aug. 21, 1922, W. E. Flowers 6351, Wash. Ured. 1248.

191. Uromyces junci-effusi Sydow

Monog. Ured. 2:290, 1910.
Puccinia junci Schw. Trans. Am. Phil. Soc. II-4:295, 1832 (not *P. junci* Desmaz. 1825.)
Uromyces effusus Arth. Jour. Myc. 13:193, 1907 (not *U. effusus* De-Toni, 1888).
Nigredo junci-effusi (Sydow) Arth., N. Am. Flora 7:239, 1912.

On Juncaceae: II, III. (0, I unknown, probably on Aster).

Juncus ensifolius Wikstr. Falcon Valley, Sept. 17, 1901, W. N. Suksdorf 653, Barth. N. Am. Ured. 1595, Arth. Herb.; Moclips, Aug.

17, 1914, A. S. Hitchcock, Arth. Herb.; Locke, Sept. 13, 1915, W. E. Flowers 6345, Wash. Ured. 1145; Lake Chelan, Aug. 27, 1916, J. R. Weir 11217, Arth. Herb.

Juncus nevadensis Wats. Juanita, May 24, 1924, Wash. Ured. 1335.

Juncus orthophyllus Cov. Falcon Valley, Sept. 11, 1883, W. N. Suksdorf 49, N. Am. Ured. 689, Wash. Ured. 508; Mt. Chopaka, Aug., 1897, A. D. Elmer, Arth. Herb.

192. Uromyces lupini Berk. & Curt.

Proc. Am. Acad. 4:126, 1858.
Uredo lupini Berk. & Curt. Proc. Am. Acad. 4:126, 1858.
Uromyces tomentellus Cooke, Grevillea 6:138, 1878.
Uromyces astragali lupini De-Toni, in Sacc. Syll. Fung. 7:550, 1888.
Nigredo lupini (Berk. & Curt.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:252, 1912.

On Leguminosae: 0, I, II, III. Autoecious.

Lupinus polyphyllus Lindl. Falcon Valley, July 24, 1883, W. N. Suksdorf 29, Wash. Ured. 504; also July 20, 1886, W. N. Suksdorf 331, Arth. Herb., Wash. Ured. 606; Manor, July 14, 1899, C. V. Piper 674, Arth. Herb.

Lupinus suksdorfii Robinson. Bingen, Nov. 15, 1923, W. N. Suksdorf 1097, Wash. Ured. 1276.

Lupinus sulphureus Dougl. Dayton, Sept. 30, 1919, G. L. Zundel, Wash. Ured. 1139.

Lupinus sp. Glendale, October 18, 1918, C. R. Stillinger 617, Wash. Ured. 806; Pullman, September 30, 1920, F. D. Heald, Herb. W.S.C. 736, Wash. Ured. 2767; Langley, Sept., 1921, J. M. Grant, Wash. Ured. 300.

193. Uromyces medicaginis Pass.

Thüm. Herb. Myc. Oecon. 156, 1874.
Nigredo medicaginis (Pass.) Arthur, N. Am. Flora 7:256, 1912.

On Leguminosae: II, III. Heteroecious.

Medicago lupulina L. Medina, Nov. 12, 1921, Wash. Ured. 236.

This heteroecious form has its pycnia and aecia on Euphorbia in Europe, but not yet found in America.

194. Uromyces miurae Sydow

Ann. Myc. 11:94, 1913.
Pucciniola miurae (Sydow) Arth., N. Am. Flora 7:442, 1921.

On Liliaceae: III. (0, I unknown).

Fritillaria lanceolata Pursh. Falcon Valley, May 19, 1884, W. N. Suksdorf 172, Arth. Herb., Wash. Ured. 540; Liberty Creek, May 11, 1907, T. A. Bonser 42, Arth. Herb.

195. Uromyces nerviphila (Grog.) Comb. Nov.

Puccinia nerviphila Grognot, Pl. Crypt. Saône-et-Loire 154, 1863.
Uromyces flectens Lagerh. Sv. Bot. Tidskr. 3:36, 1909.
Pucciniola nerviphila (Grognot) Arth. N. Am. Flora 7:448, 1921.

On Leguminosae: 0, I, III.

Trifolium repens L. Bingen, July 27, 1894, W. N. Suksdorf 453, Wash. Ured. 666; Kirkland, July 10, 1920, C. R. Stillinger 707, Wash. Ured. 815; Hoquiam, July 2, 1920, C. R. Stillinger 755, Wash. Ured. 1085.

196. Uromyces oblongus Vize

Grevillea 5:110, 1877.
Uromyces minor Schroet. Krypt. Fl. Schles. 3[1]:310, 1887.
Uromycopsis minor Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Pucciniola oblonga (Vize) Arth., N. Am. Flora 7:447, 1921.

On Leguminosae: 0, I, III. Autoecious.

Trifolium ciliolatum Benth. Bingen, June 7, 1899, W. N. Suksdorf 989, Wash. Ured. 750.

Trifolium dubium Sibth. Bingen, May 6, 1894, W. N. Suksdorf, Wash. Ured. 769; Pleasant Beach, Bainbridge Island, July 27, 1912, E. Bartholomew, Barth. Fungi Columb. 4786, Arth. Herb.; Port Blakely, Bainbridge Island, July 27, 1912, E. Bartholomew, Barth. Fungi Columb. 4496, Arth. Herb.; Spokane, June 2, 1914, W. E. Flowers 6318, Wash. Ured. 1143, also June 25, 1919, W. E. Flowers 6332, Wash. Ured. 1260; Olympia, June 28, 1920, C. R. Stillinger 710, Wash. Ured. 818; Winslow, July 6, 1920, Wash. Ured. 150; Langley, May, 1922, J. M. Grant, Wash. Ured. 302.

Trifolium procumbens L. Friday Harbor, July 13, 1919, G. Howard, Wash. Ured. 130.

Trifolium variegatum Nutt. Bingen, May 23, 1884, W. N. Suksdorf 167, Arth. Herb., Wash. Ured. 536.

197. Uromyces occidentalis Dietel

Hedwigia Beibl. 42:98, 1903.
Uromyces rugosus Arth. Bot. Gaz. 39:386, 1905.
Nigredo occidentalis (Diet.) Arth., N. Am. Flora 7:252, 1912.

On Leguminosae: II, III. (0, I unknown).

Lupinus lyallii Gray. Mt. Adam, Aug. 10, 1885, W. N. Suksdorf 189, Arth. Herb., Wash. Ured. 547.

198. Uromyces peckianus Farl.

Proc. Am. Acad. 18:78, 1883.
Caeomurus peckianus Kuntze, Rev. Gen. 3[2]:450, 1898.
Nigredo peckiana (Farl.) Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:230, 1912.

On Chenopodiaceae: 0, I. Heteroecious.

Atriplex littoralis L. Fort Lawton, May 26, 1922, Wash. Ured. 1002.

Salicornia ambigua Michx. Friday Harbor, May 22, 1909, T. C. Frye, Arth. Herb.; Ft. Lawton, June 21, 1920, Grace Howard, Wash. Ured. 152; Eagle Harbor, June 9, 1923, Wash. Ured. 1814; Rolling Bay, June 10, 1923, Wash. Ured. 1815.

On Poaceae: II, III.

Distichlis spicata (L.) Greene. Port Orchard, Aug. 9, 1912, E. Bartholomew, N. Am. Ured. 796, Arth. Herb.; Winslow, June 10, 1920, Wash. Ured. 151; Ft. Lawton, Nov. 11, 1920, Wash. Ured. 153; Rolling Bay, Oct. 2, 1921, Wash. Ured. 212; Port Townsend, Nov. 16, 1922, E. Bethel, Wash. Ured. 1079.

This species is morphologically indistinguishable from *Puccinia subnitens* except in the character of the teliospore.

199. Uromyces perigynius Halsted

Jour. Myc. 5:11, 1889.
Uromyces caricinus Ellis & Ev. Bull. Torrey Club 22:58, 1895.
Nigredo perigynia (Halsted) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:235, 1912.

On Cyperaceae: II, III. Heteroecious. (0, I on Compositae).

Carex athrostachya Olney. Spangle, June, 1884, W. N. Suksdorf 146, Wash. Ured. 527.

200. Uromyces polygoni (Pers.) Fuckel

Symb. Myc. 64, 1869.
Puccinia polygoni Pers. Neues Mag. Bot. 1:119, 1794.
Nigredo polygoni (Pers.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:243, 1912.

On Polygonaceae: 0, I, II, III. Autoecious.

Polygonum aviculare L. Almota, June 22, 1895, C. V. Piper 477, Arth. Herb., Wash. Ured. 2912; Bingen, Aug. 23, 1898, W. N. Suksdorf 551, Wash. Ured. 697; Wiser Lake, Aug. 14, 1909, T. C. Frye, Arth. Herb.; Bremerton, July 17, 1912, E. Bartholomew, Barth. N. Am. Ured. 1295 and 894, Barth. Fungi Columb. 4499, Arth. Herb.; Pullman, July 20, 1916, B. F. Dana, Herb. W.S.C. 394, Wash. Ured. 2758; Puyallup, Sept. 10, 1917, A. Frank 325, Wash. Ured. 434; Seattle, Sept. 10, 1917, Wash. Ured. 79; Kirkland, Sept. 20, 1920, Wash. Ured. 184; Winslow, Sept. 10, 1920, Wash. Ured. 183; Richland, June 15, 1921, G. L. Zundel, Wash. Ured. 1107; Nisqually River, Thurston Co., July 25, 1922, Wash. Ured. 1285.

201. Uromyces porosus (Peck) Jackson

Brooklyn Bot. Gard. Mem. 1:281, 1918.
Aecidium porosum Peck, Bot. Gaz. 3:34, 1878.
Uromyces coloradensis Ellis & Ev., Erythea 1:204, 1893.
Uromycopsis porosa Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Puccíniola porosa (Peck) Arthur, N. Am. Flora 7:450, 1921.

On Leguminosae: 0, I, III. Autoecious.

Vicia americana Muhl. Falcon Valley, June 1, 1883, W. N. Suksdorf, Arth. Herb.; White Salmon River, June 27, 1883, W. N. Suksdorf 76, Wash. Ured. 520; Mt. Adams, July 14, 1886, W. N. Suksdorf 329, Wash. Ured. 604; Seattle, May, 1892, C. V. Piper, Arth. Herb.; Bingen, May 23, 1901, W. N. Suksdorf 1099, Wash. Ured. 1324; Hillyard, June 10, 1914, W. E. Flowers 6056, Wash. Ured. 1106; Pullman, June 30, 1916, B. F. Dana, Herb. W.S.C. 320, Wash. Ured. 2752; Winslow, June 10, 1919, Wash. Ured. 347; Friday Harbor, July, 1919, Grace Howard, Wash. Ured. 129; Wawawai, May 19, 1922, C. S. Parker, Herb. W.S.C. 1048, Wash. Ured. 2815.

Vicia americana minor Hook. (*V. linearis* Gr.). Seattle, June, 1892, C. V. Piper, Arth. Herb.

202. Uromyces probus Arthur

Bull. Torrey Club 38:376, 1911.
Nigredo proba Arthur, N. Am. Flora 7:243, 1912.

On Iridaceae: 0, I, II, III. Autoecious.

Olsynium grandiflorum (Dougl.) Raf. Bingen, July 10, 1893, W. N. Suksdorf 339, Arth. Herb., Wash. Ured. 611; Kamiak Butte, May 24, 1921, C. S. Parker, Herb. W.S.C. 771, Wash. Ured. 2780; Pullman, July 4, 1922, C. S. Parker, Herb. W.S.C. 1051.

203. Uromyces proemiens (DC.) Pass.

Rab. Fungi, Eur. 1795, 1873.
Uredo proëminens DC. Fl. Fr. 2:235, 1805.
Uromyces euphorbiae Cooke & Peck, Ann. Rep. N. Y. State Mus. 25:90, 1873.
Uromyces macounianus Ellis & Ev., Proc. Phila. Acad. 1893:155, 1893.
Nigredo proëminens (DC.) Arth. N. Am. Flora 7:259, 1912.

On Euphorbiaceae: 0, I, II, III. Autoecious.

Euphorbia glyptosperma Engelm. Wawawai, Aug. 4, 1899, R. M. Horner 1261, Herb. W.S.C.; Waitsburg, Aug. 24, 1899, R. M. Horner 1260, Herb. W.S.C.

Euphorbia serpyllifolia Pers. Bingen, Sept. 20, 1893, W. N. Suksdorf 253, Arth. Herb., Wash. Ured. 577; Oroville, July 20, 1919, L. Y. Leonard, Wash. Ured. 140.

Euphorbia sp. Pullman, July, 1920, G. L. Zundel, Wash. Ured 170.

204. Uromyces psoraleae Peck

Bot. Gaz. 6:239, 1881.
Uromycopsis psoraleae Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Pucciniola psoraleae (Peck) Arthur, N. Am. Flora 7:446, 1921.

On Leguminosae: 0, I, III. Autoecious.

Psoralea lanceolata scabra (Nutt.) Piper. Spokane, Aug. 7, 1913, W. E. Flowers 6033, Wash. Ured. 1155.

205. Uromyces punctatus Schröt.

Abh. Schles. Ges. 48:10, 1870.
Uromyces astragali Sacc. Mycol. Ven. Specim. 208, hyponym, 1873.
Nigredo punctata (Schröt.) Arth., N. Am. Flora 7:253, 1912.

On Leguminosae: II, III. Heteroecious. (0, I on Euphorbiaceae).

Astragalus adsurgens Pall. Ft. George Wright, Aug. 10, 1919, W. E. Flowers 6396, Wash. Ured. 1100.

Astragalus glareosus Dougl. Bingen, Aug. 3, 1894, W. N. Suksdorf 401, Wash. Ured. 655.

The pycnia and aecia of this heteroecious form have been reported on Euphorbia in Europe but have not yet been found in America.

206. Uromyces scirpi (Cast.) Burrill

Bot. Gaz. 9:188, 1884.
Uredo scirpi Cast. Cat. Pl. Mars. 214, 1845.
Uromyces lineolatus Schröt. Rab. Fungi Eur. 2077, 1876.
Uromyces maritimus Plowr. Gard. Chron. III-7:746, 1890.
Uromyces burrilli Lagerh. Tromö Mus. Aarsh. 17:41, 1895.
Nigredo scirpi (Cast.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:233, 1912.

On Cyperaceae: II, III. (0, I on Umbelliferae and Primulaceae).

Scirpus pacificus Britton. Langley, Oct., 1922, J. M. Grant, Wash. Ured. 1277.

207. Uromyces seditiosus Kern

Torreya 11:212, 1911.
Nigredo seditiosa (Kern) Arthur, N. Am. Flora 7:225, 1912.

On Plantaginaceae: 0, I. Heteroecious. (II, III on Poaceae).

Plantago eriopoda Torr. Spokane, July 15, 1914, W. E. Flowers 6118, Wash. Ured. 1156.

208. Uromyces silenes (Schlecht.) Fuckel

Symb. Myc. 61:1869.
Uromyces pulchellus Ellis & Ev. Bull. Torrey Club 22:57, 1895.
Nigredo silenes (Schlecht.) Arth. N. Am. Flora 7:247, 1912.

On Caryophyllaceae: 0, I, II, III. Autoecious.

Silene douglasii multicaulis (Nutt.) Robinson. Pullman, June 9, 1897, C. V. Piper 405, Wash. Ured. 2920.

Silene sp. Lake Chelan, Aug. 14, 1892, C. V. Piper, Arth. Herb.; Bonapart Lake, July 20, 1921, C. S. Parker, Herb. W.S.C. 948, Wash. Ured. 2804.

209. Uromyces silphii (Burrill) Arthur

Jour. Myc. 13:202, 1907.
Aecidium compositarum silphii Burrill, De-Toni in Sacc. Syll. Fung. 7:798, 1888.
Aecidium silphii Sydow, Ured. 1546, 1901.
Uromyces junci-tenuis Sydow, Monog. Ured. 2:289, 1910.
Nigredo silphii (Burrill) Arthur, N. Am. Flora 7:239, 1912.

On Juncaceae: II, III. (0, I on Silphium).

Juncus dudleyi Wiegand. Pullman, July 20, 1896, A. D. Elmer, Arth. Herb.

Juncus longistylis Torr. Spokane Co., Aug. 10, 1899, W. N. Suksdorf, in U. S. Nat. Herb. Phanerogamic No. 2525.

Juncus tenuis Willd. Montesano, July 21, 1898, A. A. & E. G. Heller in N. Y. Bot. Gard. Phanerogamic No. 4074.

210. Uromyces solidaginis (Sommerf.) Neissl.

Verh. Nat.-Ver. Brünn 10:163, 1872.
Caeoma solidaginis Sommerf. Suppl. Fl. Lapp. 234, 1826.
Teleutospora solidaginis (Sommerf.) Arth. & Bisby, Bull. Torrey Club 48:39, 1921; N. Am. Flora 7:518, 1922.

On Compositae: 0, III.

Solidago serotina Ait. Pullman, July 31, 1894, C. V. Piper, Arth. Herb., Wash. Ured. 1211.

211. Uromyces suksdorfii Diet. & &Holw.

Erythea 3:77, 1895.

On Caryophyllaceae: 0, I, II, III. Autoecious.

Silene oregana Wats. West Klickitat Co., July 17, 1894, W. N. Suksdorf 385, Wash. Ured. 634; Mt. Adams, Aug. 6, 1903, W. N. Suksdorf 970, Wash. Ured. 735.

Silene scouleri Hook. Tieton River, July 18, 1901, C. V. Piper 831, Arth. Herb.

212. Uromyces trifolii (Hedw. f.) Lev.

Ann. Sci. Nat. III.-8:371, 1847.
Puccinia trifolii Hedw. f., DC. Fl. Fr. 2:225, 1805.
Nigredo trifolii (Hedw. f.) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:255, 1912.

On Leguminosae: 0, I, II, III. Autoecious.

Trifolium hybridum L. Bainbridge Island, Aug. 3, 1909, E. Bartholomew, Barth. Fungi Columb. 3197, Arth. Herb.; Bremerton, Aug. 2, 1912, E. Bartholomew, Barth. N. Am. Ured. 899, Arth. Herb.;

Puyallup, Sept. 16, 1919, A. Frank 296, Wash. Ured. 454; Pullman, Oct. 26, 1920, F. D. Heald, Herb. W.S.C. 760, Wash. Ured. 2774; Seattle, May 27, 1923, Vera Stedman, Wash. Ured. 1804.

Trifolium macrocephalum Poir. Bingen, Apr. 19, 1899, W. N. Suksdorf 541, Arth. Herb., Wash. Ured. 687.

Trifolium repens L. Bremerton, July 31, 1912, E. Bartholomew, Barth. Fungi Columb. 4500, Arth. Herb.; Prosser, Aug. 20, 1915, F. D. Heald, Herb. W.S.C. 216, Wash. Ured. 2736; Fife, Aug. 17, 1917, A. Frank and F. D. Heald, Wash. Ured. 428; Spokane, Aug. 29, 1920, J. R. Weir 14426, Arth. Herb.; Puyallup, Sept. 16, 1920, A. Frank 149, Wash. Ured. 411; Medina, Nov. 12, 1921, Wash. Ured. 235; Bothell, Nov. 12, 1921, Wash. Ured. 259; Kirkland, Nov. 12, 1921, Wash. Ured. 240; Snoqualmie Falls, Dec. 10, 1921, Wash. Ured. 281; Seattle, May 20, 1922, Wash. Ured. 1213; also May 16, 1923, Vera Stedman, Wash. Ured. 1803.

213. Uromyces unitus Peck

Bull. Torrey Club 10:74, 1883.
Caeomurus unitus Kuntze, Rev. Gen. 3³:451, 1898.
Uromycopsis unita Arth. Result. Sci. Congr. Bot. Vienne 345, 1906.
Puccinia unita (Peck) Arth., N. Am. Flora 7:445, 1921.

On Portulacaceae: 0, I, III. Autoecious.

Lewisia columbiana (Howell) Robinson. Collected in Washington Territory by T. S. Brandegee, Arth. Herb. (type).

As far as the writer is aware, this is the only record of this rust being collected in the state of Washington. The data on the collection is very meager, no date or definite locality, merely "Washington Territory." There might, therefore, be some doubt whether this collection was really made in this state.

214. Uromyces zygadeni Peck

Bot. Gaz. 6:239, 1881.
Uromyces fraserae Arth. & Rick. Jour. Myc. 8:128, 1902.
Nigredo zygadeni (Peck) Arth. Result. Sci. Congr. Bot. Vienne 344, 1906; N. Am. Flora 7:240, 1912.

On Liliaceae: 0, I, II, III. Autoecious.

Zygadenus venenosus Wats. Locke, May 5, 1916, W. E. Flowers 6136, Wash. Ured. 1238.

Uropyxis Magnus

215. Uropyxis sanguinea (Peck) Arthur

N. Am. Flora 7:155, 1907.
Uromyces sanguineus Peck, Bot. Gaz. 4:128, 1879.
Puccinia mirabilissima Peck, Bot. Gaz. 6:226, 1881.
Uropyxis mirabilissima Magn. Ber. Deuts. Bot. Ges. 10:193, 1892.
Dicaeoma mirabilissimum Kuntze, Rev. Gen. 3:469, 1898.

On Berberidaceae: 0, II, III. Autoecious.

Berberis aquifolium Pursh. Falcon Valley, June 1, 1883, W. N. Suksdorf 59, Ellis N. Am. Fungi 1451, Arth. Herb., Wash. Ured. 513; Charleston, May, 1890, A. Parker, Wash. Ured. 62; Wawawai, April 27, 1913, J. G. Hall, Arth. Herb.; Colfax, Mar. 24, 1918, F. D. Kern, Arth. Herb.; Port Townsend, Apr. 2, 1921, G. L. Zundel, Wash. Ured. 1222; Winslow, May 24, 1921, Wash. Ured. 790; Seattle, May 19, 1922, Wash. Ured. 952; Langley, May, 1922, A. Reuter, Wash. Ured. 194; Port Orchard, June 5, 1922, Wash. Ured. 989; also June 9, 1923, A. J. Seltzer, Wash. Ured. 1808.

Berberis nervosa Pursh. Winslow, Sept. 10, 1920, Wash. Ured. 221; Kirkland, Nov. 12, 1921, Wash. Ured. 244.

Berberis repens Lindf. Spokane, May 10, 1909, W. E. Flowers 6109, Wash. Ured. 1111; Pullman, April 18, 1915, F. D. Heald, Herb. W.S.C. 9, Wash. Ured. 2702; Spangle, May 12, 1916, W. N. Suksdorf 1064, Wash. Ured. 762; Locke, June 7, 1916, W. E. Flowers 6375, Wash. Ured. 1112.

Berberis sp. Sumner, June 7, 1916, A. Frank, Wash. Ured. 358.

Magnus created the genus Uropyxis on account of the following characteristics: 1. Teliospores with more than one germ pore. 2. Epispore with a gelatinous layer.

UREDINALES IMPERFECTI

The telial stage of a rust is the one on which classification is largely based. If for any reason this stage is not known the rust is regarded as imperfect. For convenience these species which are usually spoken of as form genera are put into a group by themselves, and designated as UREDINALES IMPERFECTI.

KEY TO THE FORM GENERA

A. Spores in chains.
  B. Peridium absent. CAEOMA (p. 376).
  BB. Peridium present.
    C. Peridium toothed, body cup-shaped. AECIDIUM (p. 375).
    CC. Peridium fimbriate, body elongate. (ROESTELIA)*.
    CCC. Peridium irregularly split PERIDERMIUM (p. 377).
AA. Spores not in chains. (UREDO)*.

Aecidium Pers.

216. Aecidium collinsiae Ellis & Ev.

Bull. Washb. Lab. Nat. Hist. 1:4, 1884; N. Am. Flora 7:637, 1924.
Aecidium tonellae D. & H., Erythea 3:77, 1895.

On SCROPHULARIACEAE: 0, I.

Collinsia parviflora Dougl. Falcon Valley, June 1, 1883, W. N. Suksdorf 63, Wash. Ured. 516; Cle Elum, June 1, 1892, L. F. Henderson, Arth. Herb.; Bingen, May 11, 1894, W. N. Suksdorf 986.

Collinsia rattani Gray. Falcon Valley, Apr. 30, 1884, W. N. Suksdorf 160, Wash. Ured. 530.

Tonella collinsioides Nutt. Bingen, Aug. 29, 1894, W. N. Suksdorf 380, Wash. Ured. 629.

This is apparently a heteroecious form with its alternate host unknown. It is found only in the Pacific Northwest.

217. Aecidium columbiense Ellis & Ev.

Erythea 1:206, 1893; N. Am. Flora 7:644, 1924.

On COMPOSITAE: 0, I.

Hieracium albiflorum Hook. Falcon Valley, May 10, 1886, W. N. Suksdorf 244A, Wash. Ured. 569A; White Salmon River, May 12, 1886, W. N. Suksdorf 244B, Wash. Ured. 569B; Locke, May 19, 1915, W. E. Flowers 6312, Wash. Ured. 1244; Langley, May 21, 1921, A. Reuter, Wash. Ured. 971; Joyce, May 10, 1912, S. Biggs, Wash. Ured. 949.

*Not reported as occurring in the State of Washington.

218. Aecidium eurotiae Ellis & Ev.

Jour. Myc. 6:119, 1891.

On Chenopodiaceae: 0, I.

Eurotia lanata (Pursh) Moq. Yakima, April, 1898, C. V. Piper 419, Wash. Ured. 1234.

219. Aecidium graebnerianum Henn.

Hedwigia 37:273, 1898; N. Am. Flora 7:622, 1924.
Aecidium alaskanum Trelease, Harr. Alaska Exp. 5:37, 1904.

On Orchidaceae: 0, I.

Limnorchis dilatata (Pursh) Rydb. Chiquash Mt., Skamania Co., Aug. 6, 1899, W. N. Suksdorf 540, Wash. Ured. 686; Silverton, July 7, 1920, C. R. Stillinger 700, Wash. Ured. 809.

Limnorchis leucostachys Rydb. Chiquash Mts., Skamania Co., Aug. 12, 1886, W. N. Suksdorf 528.

This is probably a heteroecious form with the alternate host unknown. It is found only along the Pacific coast.

220. Aecidium humuli sp. nov.

On Moraceae: 0, I.

Humulus lupulus L. (Cultivated Hops). During July, 1915, the writer collected the aecial stage of a rust on this host in the Yakima Valley. This is doubtless some heteroecious form but it is difficult to determine where it belongs.

The aecia contort the stem of the host much like those of *Puccinia clematidis* on Clematis. Within half a mile of where this material was collected there was a heavy infection on *Clematis ligusticifolia* Nutt. The writer is not in a position to make any definite statement regarding this rust, but merely wishes to record the fact of its collection. Arth. Herb.; Wash. Ured. 1361.

Caeoma Link

221. Caeoma dubium Ludwig

Phytopath. 5:281, 1915; N. Am. Flora 7:648, 1924.

On Pinaceae: 0, I.

Tsuga heterophylla Sarg. Bainbridge Is., July 17, 1909, E. Bartholomew, Fungi Columb. 3103, Herb. W.S.C.; Silverton, July 1, 1920, C. R. Stillinger 749, Wash. Ured. 851; Kirkland, July 10, 1920, C. R. Stillinger 680, Wash. Ured. 808.

Peridermium Lev.

222. Peridermium coloradense (Diet.) Arth. & Kern

Bull. Torrey Club 33:426, 1906; N. Am. Flora 7:647, 1924.
Aecidium coloradense Diet. in E. & P. Nat. Pfl. 1[1]**:78. 1897.
Peridermium boreale Arth. & Kern, Bull. Torrey Club 33:425, 1906.

On Pinaceae: 0, I.

Picea canadensis (Mill) B. S. P. Spokane, Aug. 22, 1921, W. E. Flowers 6388, Wash. Ured. 1115.

Picea engelmanni Engelm. Parker Lake, Aug. 25, 1915, W. E. Flowers 6392, Wash. Ured. 1116; Locke, July 20, 1917, W. E. Flowers 6098, Wash. Ured. 2547.

Picea excelsa Link. Spokane, Aug. 14, 1912, W. E. Flowers 6389, Wash. Ured. 1117.

Picea sitchensis Carr. Ilwaco, July, 1918, Wash. Ured. 84; Pacific Co., Aug. 13, 1919, A. Frank, Wash. Ured. 424.

This rust is probably a heteroecious form, having it aecia on species of Cerastium but no cultural work has as yet been reported.

223. Peridermium ornamentale Arth.

Bull. Torrey Club 28:665, 1901; N. Am. Flora 7:646, 1924.
Peridermium holwayi Sydow, Ann. Myc. 1:19, 1903.

On Pinaceae: 0, I.

Abies lasiocarpa (Hook.) Nutt. Chiquash Mt. (type locality), Skamania Co., Aug. 11, 1886, W. N. Suksdorf 296, Arth. Herb., Wash. Ured. 587; Mt. Adams, Sept. 4, 1900, W. N. Suksdorf 588, Arth. Herb., Wash. Ured. 703; Chelan Lake, Aug. 26, 1916, J. R. Weir.

224. Peridermium rugosum Jackson

N. Am. Flora 7:646, 1924.

On Pinaceae: 0, I. Heteroecious.

Abies amabilis Forbes. Cascade Mts., Snohomish Co., Aug., 1915, H. Schmitz, Arth. Herb.

Abies grandis Lindl. Lake Cushman, Oct., 1915, Rose M. Taylor, Arth. Herb. (type locality).

This species is reported elsewhere only from Oregon.

Location of places cited

The following is a list of the places where collections of rusts have been made and the county (*Italics*) in which each is located. If a more accurate location within the county is desired, it is suggested that the reader consult Bulletin 17, entitled "A Geographic Dictionary of Washington," issued by the Washington Geological Survey at Olympia.

Aberdeen, *Grays Harbor*
Adna, *Lewis*
Alki Point, *King*, near Seattle
Almota, *Whitman*
Arlington, *Snohomish*
Auburn, *King*

Bainbridge Island, *Kitsap*
Barlow Pass, *Snohomish*
Battle Ground, *Clarke*
Bay Center, *Pacific*
Belfair, *Mason*
Bellevue, *King*
Bellingham, *Whatcom*
Big Four, *Snohomish*
Bingen, *Klickitat*
Birch Bay, *Whatcom*
Black Diamond, *King*
Blaine, *Whatcom*
Blue Mts., *Walla Walla*
Bonapart Lake, *Okanogan*
Boston Harbor, *Thurston*
Bothell, *King*
Bow, *Skagit*
Bremerton, *Kitsap*
Burley, *Kitsap*
Burlington, *Skagit*
Bush Prairie, *Clarke*

Cape Horn, *Skamania*
Carson, *Skamania*
Cashmere, *Chelan*
Castle Point, on Castle Island, *San Juan*
Castle Rock, *Cowlitz*
Cedar River, *King*
Center, *Jefferson*
Charleston, *Kitsap*
Chehalis, *Chelan*
Chelan, *Chelan*
Chelan Lake, *Chelan*
Chenowith, in the southeastern part of *Skamania*
Cheney, *Spokane*
Chesaw, *Okanogan*
Chico, *Kitsap*
Chimacum, *Jefferson*
Chiquash Mts., *Skamania*
Chiwaukum, *Chelan*
Clallam Bay, *Clallam*
Clark Spring, *Pend Oreille*
Clarkston, *Asotin*
Clear Lake, *Skagit*
Cle Elum, *Kittitas*
Colfax, *Whitman*
Colton, *Whitman*
Columbus, *Klickitat*
Connell, *Franklin*
Cook, *Skamania*
Cosmopolis, *Grays Harbor*
Coulee City, *Grant*
Coupeville, *Island*
Cove, *King*
Crescent Lake, *Clallam*
Croker, *Jefferson*

Dabob, *Jefferson*
Danville, *Ferry*
Darrington, *Snohomish*
Davenport, *Lincoln*
Dayton, *Columbia*
Deep Creek, *Spokane*
De Lions, *Jefferson*
Deming, *Whatcom*
Dewatto, *Mason*
Discovery Bay, *Jefferson*
Dixie, *Walla Walla*
Doe Bay, *San Juan*
Dosewallips River, *Jefferson*
Duckabush River, *Jefferson*
Dungeness, *Clallam*

Eagle Harbor, Bainbridge Island, *Kitsap*
East Sound, *San Juan*
Eatonville, *Pierce*
Edison, *Skagit*
Edmonds, *Snohomish*
Elbe, *Pierce*
Ellensburg, *Kittitas*
Elma, *Grays Harbor*
Elwha, *Clallam*
Emer, *Grays Harbor*
Ephrata, *Grant*
Everett, *Snohomish*

Fairfax, *Pierce*
Falcon Valley, in the northwestern corner of *Klickitat* at the base of Mt. Adams

Ferncliff, on Rolling Bay, Bainbridge Island, *Kitsap*
Ferndale, *Whatcom*
Fife, *Pierce*
Fir, *Skagit*
Flattop Island, *San Juan*
Forks, *Clallam*
Fort Coville, *Stevens*
Fort George Wright, *Spokane*
Fort Lawton, *King*
Freeman, *Spokane*
Friday Harbor, *San Juan*

Garfield, *Whitman*
Georgetown, *King*, part of Seattle,
Gig Harbor, *Pierce*
Glacier, *Whatcom*
Glacier Peak, *Whatcom*
Glendale, *Island*
Goat Mt., near Mt. Rainier, in East Central *Lewis*
Goldendale, *Klickitat*
Granite, *Snohomish*
Granite Falls, *Snohomish*
Greenback Island, *Snohomish*
Guler, northwestern *Klickitat*

Hadlock, *Jefferson*
Hanford, *Benton*
Harrington, *Lincoln*
Hartford, *Snohomish*
Hillyard, *Spokane*
Holly, *Kitsap*
Hoquiam, *Grays Harbor*
Houghton, *King*
Husum, *Klickitat*

Ilwaco, *Pacific*
Index, *Snohomish*
Indian Canyon, *Spokane*
Joyce, *Clallam*
Juanita, *King*
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